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Fish, Wildlife and Parks
1420 East Sixth Avenue
Helena, MT 59620
(406) 444-4594

BEFORE THE MONTANA BOARD OF NATURAL
RESOURCES AND CONSERVATION

* * * * *

IN THE MATTER OF WATER)
RESERVATION APPLICATION NOS.)
69903-41O 71895-41I 72578-41L)
70115-41F 71966-41S 71579-41T)
70117-41H 71997-41J 72580-41A)
70118-41H 71998-41S 72581-41I)
70119-41H 72153-41P 72582-41I)
70270-41B 72154-41K 72583-41P)
71537-41P 72155-41A 72584-41S)
71688-41L 72256-41P 72585-41M)
71889-41Q 72307-41Q 72586-41P)
71890-41K 72574-41O 72587-41G)
71891-41P 72575-41K 72588-40C)
71892-41G 72576-40E 73198-41I)
71893-41K 72577-41P 73199-41S)
71894-41I IN THE UPPER)
MISSOURI RIVER BASIN)

* * * * *

DEPARTMENT OF FISH, WILDLIFE AND PARKS'
PROPOSED FINDINGS OF FACT,
CONCLUSIONS OF LAW,
ORDER AND
BRIEF

* * * * *

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TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	FINDINGS OF FACT FOR DFWP.	3
A.	FINDINGS ON THE PURPOSE OF INSTREAM RESERVATIONS OF WATER APPLIED FOR BY DFWP [SECTION 85-2-316(4)(a)(ii), MCA].	3
B.	FINDINGS ON THE NEED FOR INSTREAM RESERVATIONS OF WATER APPLIED FOR BY DFWP [SECTION 85-2-316(4)(a)(ii)].	6
(1)	Fishery Values	11
	Gallatin River Sub-basin	12
	Madison River Sub-basin	15
	Jefferson River Sub-basin.	18
	Big Hole River Sub-basin	20
	Ruby River Sub-basin	23
	Red Rock - Beaverhead River Sub-basin.	24
	Missouri River Sub-basin Above Canyon Ferry Dam	28
	Missouri River Mainstem Below Canyon Ferry Dam	29
	Hauser/Holter Reservoir Sub-basins	40
	Little Prickly Pear Creek Sub-basin.	43
	Dearborn River Sub-basin	44
	Sheep Creek (Missouri River)	47
	Smith River Sub-basin	48
	Sun River Sub-basin	50
	Belt Creek Sub-basin	52
	Highwood Creek	55
	Shonkin Creek	55
	Marias River Sub-basin	55
	Teton River Sub-basin	59
	Judith River Sub-basin	61
	Cow Creek	66
	Musselshell River Sub-basin	66
	Collar Gulch	70
	Big Dry and Little Dry Creeks	71
	Bean Lake	71
	Antelope Butte Swamp	72
(2)	Threatened and Endangered Fish Species and Species of Special Concern	73
	Westslope Cutthroat Trout	73
	Arctic Grayling	74
	Pallid Sturgeon	77
	Sturgeon Chub	80
	Paddlefish	80



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	Northern Redbelly Dace x Finescale Dace Hybrid	81
	Sickelfin Chub	81
	Blue Sucker	81
(3)	Riparian Values	82
(4)	Wildlife Values	85
	Bald Eagle	85
	Peregrin Falcon	85
	Whooping Crane	86
	Grizzly Bear	86
C.	FINDINGS ON THE AMOUNT OF THE INSTREAM RESERVATIONS OF WATER APPLIED FOR BY DFWP [SECTION 85-2-316, MCA]	87
(1)	Instream Flow Methods	87
(2)	Water Availability	104
(3)	Murphy Rights	107
(4)	50% Limitation	108
D.	FINDINGS THAT THE INSTREAM RESERVATIONS OF WATER APPLIED FOR BY DFWP ARE IN THE PUBLIC INTEREST [MCA § 85-2-316(4)(a)(iv); ARM 36.16.107B(4)]	110
(1)	Benefit/Cost Factor	110
(2)	Net Benefits of Reservation Greater than Net Benefits of Not Granting the Reservation [ARM 36.16.107B(4)(b)]	121
(3)	Reasonable Alternatives with Greater Net Benefits	122
(4)	Irretrievable Loss of a Natural Resource	122
(5)	Adverse Impacts to Public Health, Safety and Welfare	123
(6)	Other Factors	123
(7)	Summary -- Public Interest	124
E.	FINDINGS ON THE MANAGEMENT PLAN (ARM 36.16.107B(7))	124

F.	FINDINGS OF NO ADVERSE AFFECT ON EXISTING WATER RIGHTS [SECTION 85-2-316(9)(e), MCA; ARM 36.16.107b]	129
III.	FINDINGS OF FACT: CITY OF BOZEMAN	130
IV.	FINDINGS OF FACT: CONSERVATION DISTRICTS AND BUREAU OF RECLAMATION PROJECTS	135
A.	Purpose [MCA §85-2-316(4)(a)(i); ARM 36.16.107B(1)]	135
B.	Need [MCA § 85-2-316(4)(a)(ii); ARM 36.16.107B(2)]	136
C.	Amount [MCA § 85-2-316(4)(a)(iii); ARM 36.16.107B(3)]	136
D.	Public Interest [MCA § 85-2-316(4)(a)(iv); ARM 36.16.107B(4)]	136
(1)	Benefit-Cost Factor [ARM 36.16.107B(4)(a)] . .	137
(2)	Net Benefits of Reservation Greater Than Net Benefits of Not Granting the Reservation [ARM 36.16.107B(4)(b)]	146
(3)	Reasonable Alternatives with Greater Net Benefits [ARM 36.16.107B(4)(c)]	146
(4)	Irretrievable Loss of Resource Development Opportunity [ARM 36.16.107B(4)(d)]	146
(5)	Public Health, Welfare and Safety Impacts [ARM 36.16.107B(4)(e)]	147
(a)	Water Quantity/Aquatic Habitat	
	General	148
	Gallatin River Sub-basin	150
	Jefferson River Sub-basin	151
	Boulder River Sub-basin	152
	Missouri River above Canyon Ferry Reservoir	153
	Missouri River Mainstem below Canyon Ferry Dam	153
	Dearborn River Sub-basin	154
	Smith River Sub-basin	155
	Sun River Sub-basin	157
	Belt Creek Sub-basin	159
	Teton River Sub-basin	161
	Marias River Sub-basin	163
	Judith River Sub-basin	165
	Musselshell River Sub-basin	167

Cumulative Effects of All Projects on the Missouri River	167
Bureau of Reclamation	170
Water Availability Model Predictions for Canyon Ferry Reservoir Operation	171
(b) Water Quality	173
(6) Other Factors [ARM 36.16.107B(4)(f)]	175
(7) Summary -- Public Interest Criteria	176
E. Management Plan (Financial Feasibility) [ARM 36.16.107B(7)]	178
F. Affects on Existing Water Rights [MCA § 85-2-316(9)(e); ARM 36.16.107B(8)]	179
V. FINDINGS OF FACT: DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES	184
VI. FINDINGS OF FACT: BUREAU OF LAND MANAGEMENT (BLM)	184
VII. CONCLUSIONS OF LAW	184
VIII. ORDER	190

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DEPARTMENT OF FISH,
WILDLIFE AND PARKS'
PROPOSED FINDINGS OF
FACT, CONCLUSIONS OF
LAW AND ORDER

18 * * * * *

19
20 **I. INTRODUCTION**

21 This matter came on regularly for hearing, beginning February
22 3, 1992, and continuing through February 28, 1992. The hearing was
23 conducted by Peter Stanley, duly appointed as hearing examiner by
24 the Board of Natural Resources and Conservation. The following
25 parties appeared by and through the counsel indicated:

26 Steve Brown and Stan Bradshaw

Trout Unlimited and
American Fisheries Society

1	Mona Jamison and Bill Thompson	Montana Department of
2		Health and Environmental
		Sciences
3	Robert Lane and Curtis Larsen	Department of Fish,
4		Wildlife and Parks
5	Peter S. Lineberger	Town of West Yellowstone
6	Gary Spaeth	Various Conservation
7		Districts Applicants and
		Montana Association of
		Conservation Districts
8	Holly Franz and Susan Callaghan	Montana Power Company
9	Calvin Braaksma	City of Three Forks
10	William A. Schreiber	City of Belgrade
11	Monte J. Boettger	City of Lewistown
12	John Chaffin	U.S. Department of
13		Interior, Bureau of
14		Reclamation and Bureau of
		Land Management
15	Donald Marble	Town of Chester
16	David Gliko	City of Great Falls
17	Dale Reagor	City of East Helena
18	Dale Schwanke	Pondera County Canal and
		Reservoir Company
19	Loren Tucker	Various Objectors
20	Ted Doney	Various Objectors
21	James Hubble	William E. Reichelt
22	John Bloomquist	Whitetail Water Users and
23		Various Objectors
24	Carl M. Davis	Various Objectors
25	J. B. Anderson, Jr.	Various Objectors
26	Keith Strong	Greenfields Irrigation
		District
27	Paul Smith	Various Objectors
28		

1 W. G. Gilbert, III

Various Objectors

2 Cindy Younkin, Perry Moore,
3 and Russ McElyea

Upper Musselshell Users
Association, City of
Bozeman and Various
Objectors

4 Mark Guenther

Lower Jefferson Canal

5 Mike Franich

Various Objectors

6 Hugh Brown

Liberty County and Hill
County Conservation
Districts

7 Max Hansen

Various Objectors

8
9 In addition to the formal hearing held in Helena, the hearing
10 examiner held informal hearings in Lewistown, Great Falls, Bozeman,
11 Dillon and Glasgow.

12 The hearing examiner accepted into the record prefilled,
13 written testimony of the parties, sworn testimony presented at the
14 hearing and certain documentary evidence. The Board, having fully
15 considered such evidence and the arguments of the parties, makes
16 the following Findings of Fact, Conclusions of Law, and Order. Any
17 party's proposed Findings of Fact, Conclusions of Law or Orders not
18 specifically adopted herein are rejected by the Board as not being
19 supported by the evidence or the law.
20

21
22 **II. FINDINGS OF FACT FOR DFWP**

23 **A. FINDINGS ON THE PURPOSE OF INSTREAM RESERVATIONS OF WATER**
APPLIED FOR BY DFWP (SECTION 85-2-316(4)(a)(ii), MCA).

24 1. The Montana Department of Fish, Wildlife and Parks (DFWP)
25 is an executive branch agency of the State of Montana established
26 pursuant to Section 2-15-3401, MCA, and is, therefore, qualified to

1 reserve water pursuant to Section 85-2-316, MCA. (DFWP Exh. 10,
2 Graham Dir., p. 2).

3 2. DFWP is the executive branch agency mandated by statute to
4 provide for the protection, preservation and propagation of all
5 fish and wildlife and their habitat within the state. Therefore,
6 DFWP has the responsibility and duty to represent the people of
7 Montana in applying for instream flow reservations for fish,
8 wildlife and their habitat in the Missouri River Basin above Fort
9 Peck Dam.

10 3. DFWP submitted an application in June 1989 to reserve
11 waters to maintain a minimum flow, level, or quality of water
12 throughout the year or during described portions of the year on 281
13 stream reaches, one lake, and one swamp in the Missouri River Basin
14 above Fort Peck Dam. (DFWP 72155-41A, Bd. Exhs. 37-A.1, 37-A.2,
15 and 37-A.3). The waters applied for, including reach boundaries
16 and amounts of water requested are shown in Table 1. (Spence Dir.,
17 DFWP Exh. 17, Appendix A).

18 4. By stipulation and agreement between parties, DFWP has
19 agreed to modify the reach boundaries on Mussigbrod Creek, a
20 tributary to the Big Hole River and Blacktail Deer Creek, a
21 tributary to the Beaverhead River. The modified reaches are:

- 22 (1) Mussigbrod Creek - From Hellroaring Creek to Arrow
23 Ranch's upper most existing diversion point in
24 NWSENW Section 9, T1S, R16W P.M.M. (Stipulation and
25 Agreement between DFWP and Arrow Ranch Company
26 dated February 10, 1992);

Table 1

Appendix A

23

from DEIS, Table 3-2, Page 23

Table 3-2. DFWP Instream flow requests

HEADWATERS SUBBASIN

BIG HOLE RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED	
			(cfs)	(af/yr)
American Creek	Headwaters to mouth	Jan 1 - Dec 31	2.8	2,027
Bear Creek	Headwaters to mouth	Jan 1 - Dec 31	2.8	2,027
Big Hole River #1	Warm Springs Creek to Pintlar Creek	Jan 1 - Dec 31	160	115,835
Big Hole River #2	Pintlar Creek to the old Divide Dam	Jan 1 - Dec 31	800	579,173
Big Hole River #3	Old Divide Dam to mouth	Jan 1 - Dec 31	650	470,578
Big Lake Creek	Twin Lakes outlet to mouth	Jan 1 - Dec 31	4.7	3,403
Birch Creek	Mule Creek to mouth	Jan 1 - Dec 31	10	7,240
Bryant Creek	Headwaters to mouth	Jan 1 - Dec 31	1.4	1,014
California Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136
Camp Creek	Headwaters to mouth	Jan 1 - Dec 31	5	3,620
Canyon Creek	Canyon Lake to mouth	Jan 1 - Dec 31	5	3,620
Corral Creek	Headwaters to mouth	Jan 1 - Dec 31	1	724
Deep Creek	Sevenmile and Tenmile to mouth	Jan 1 - Dec 31	18	13,031
Delano Creek	Headwaters to mouth	Jan 1 - Dec 31	0.3	217
Divide Creek	North and East forks to mouth	Jan 1 - Dec 31	3	2,172
Fishtrap Creek	West and Middle forks to mouth	Jan 1 - Dec 31	10	7,240
Francis Creek	Sand Creek to mouth	Jan 1 - Dec 31	4	2,896
French Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344
Governor Creek	Headwaters to mouth	Jan 1 - Dec 31	4	2,896
Jacobsen Creek	Tahepia Lake to mouth	Jan 1 - Dec 31	14	10,136
Jerry Creek	Headwaters to mouth	Jan 1 - Dec 31	7	5,068
Johnson Creek	Schultz Creek to Forest Service boundary	Jan 1 - Dec 31	13	9,412
Joseph Creek	Anderson Creek to mouth	Jan 1 - Dec 31	5	3,620
LaMarche Creek	West and Middle forks to mouth	Jan 1 - Dec 31	11	7,964
Miner Creek	Upper Miner Lakes to mouth	Jan 1 - Dec 31	9	6,516
Moose Creek	Headwaters to mouth	Jan 1 - Dec 31	9	6,516
Mussigbrod Creek	Hell Roaring Creek to Forest Service boundary	Jan 1 - Dec 31	10	7,240
NF Big Hole River	Ruby and Trail creeks to mouth	Jan 1 - Dec 31	30	21,719
Oregon Creek	Headwaters to mouth	Jan 1 - Dec 31	0.3	217
Pattengail Creek	Sand Lake to mouth	Jan 1 - Dec 31	12	8,688
Pintlar Creek	Orearnos Lake to mouth	Jan 1 - Dec 31	10	7,240
Rock Creek	Beaverhead National Forest boundary to mouth	Jan 1 - Dec 31	5	3,620
Ruby Creek	Pioneer and WF Ruby creeks to mouth	Jan 1 - Dec 31	4	2,896
Sevenmile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.8	1,303
Seymour Creek	Upper Seymour Lake to mouth	Jan 1 - Dec 31	13	9,412
Sixmile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.6	1,158
SF Big Hole River	Skinner Lake to mouth	Jan 1 - Dec 31	22	15,927
Steel Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344
Sullivan Creek	Headwaters to mouth	Jan 1 - Dec 31	4	2,896
Swamp Creek	Yank Swamp to mouth	Jan 1 - Dec 31	8	5,792
Tenmile Creek	Tenmile Lakes to mouth	Jan 1 - Dec 31	3.8	2,751
Trail Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136
Trapper Creek	Trapper Lake to mouth	Jan 1 - Dec 31	3.2	2,317
Twelvemile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.2	869
Warm Springs Creek	West and East forks to mouth	Jan 1 - Dec 31	20	14,479
Willow Creek	Tendoy Lake to mouth	Jan 1 - Dec 31	16	11,583
Wise River	Mono and Jacobson creeks to mouth	Jan 1 - Dec 31	35	25,339
Wyman Creek	Headwaters to mouth	Jan 1 - Dec 31	7	5,068

GALLATIN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED	
			(cfs)	(af/yr)
Baker Creek	Heeb Lane Bridge to mouth	Jan 1 - Dec 31	14	10,136
Ben Hart Creek	Headwaters to mouth	Jan 1 - Dec 31	29	20,995
Big Bear Creek	Headwaters to mouth	Jan 1 - Dec 31	2	1,448
Bridger Creek	Headwaters to mouth	Jan 1 - Dec 31	36.6	26,497
Cache Creek	Headwaters to mouth	Jan 1 - Dec 31	2.6	1,882
EF Hyalite Creek	Heather Lake to Hyalite Reservoir	Jan 1 - Dec 31	7	5,068
East Gallatin River #1	Rocky and Sourdough cks to Bozeman STP outlet	Jan 1 - Dec 31	121.3	87,817
East Gallatin River #2	Bozeman STP outlet to Thompson Spring Creek	Jan 1 - Dec 31	90	65,157
East Gallatin River #3	Thompson Spring Creek to mouth	Jan 1 - Dec 31	170	123,074

Ck - Creek EF - East Fork R - River SF - South Fork STP - sewage treatment plant WF - West Fork

Gallatin River Drainage (continued)

Gallatin River #1	Yellowstone NP boundary to WF Gallatin River	Jan 1 - Dec 31	170	123,074
Gallatin River #2	WF Gallatin River to East Gallatin River	Jan 1 - Dec 31	400	289,587
Gallatin River #3	East Gallatin River to mouth	Jan 1 - Dec 31	1,000	723,967
Hell Roaring Creek	NF Hell Roaring Creek to mouth	Jan 1 - Dec 31	16	11,583
Hyalite (Middle) Creek #1	Middle Creek Dam to Middle Creek Ditch intake	Jan 1 - Dec 31	28	20,271
Hyalite (Middle) Creek #2	I-90 bridge near Belgrade to mouth	Jan 1 - Dec 31	16	11,583
MF of the WF Gallatin R.	Headwaters to NF of the WF Gallatin River	Jan 1 - Dec 31	3	2,172
Porcupine Creek	NF Porcupine Creek to mouth	Jan 1 - Dec 31	4.5	3,258
Reese Creek	Bill Smith Creek to mouth	Jan 1 - Dec 31	5	3,620
Rocky Creek	Jackson Creek to Sourdough Creek	Jan 1 - Dec 31	51	36,922
Sourdough (Bozeman) Ck.	Mystic Reservoir to mouth	Jan 1 - Dec 31	35.9	25,990
South Cottonwood Creek	Jim Creek to Hart Ditch headgate	Jan 1 - Dec 31	14	10,136
SF Spanish Creek	Falls Creek to mouth	Jan 1 - Dec 31	15	10,859
SF of the WF Gallatin R.	Headwaters to mouth	Jan 1 - Dec 31	5	3,620
Spanish Creek	North and South forks to mouth	Jan 1 - Dec 31	70	50,678
Squaw Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688
Taylor Fork	Tumbledown Creek to mouth of Gallatin River	Jan 1 - Dec 31	36	26,063
Thompson Spring Creek	County road crossing in T1N R5E Sec 30 to mouth	Jan 1 - Dec 31	29	20,995
WF Gallatin River	Middle and North forks to mouth	Jan 1 - Dec 31	26	18,823
WF Hyalite Creek	Hyalite Lake to Hyalite Reservoir	Jan 1 - Dec 31	12	8,688

JEFFERSON AND BOULDER RIVER DRAINAGES

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af/yr)
Boulder River #1	West and South forks to High Ore Creek	Jan 1 - Dec 31	20	14,479
Boulder River #2	High Ore Creek to Cold Spring	Jan 1 - Dec 31	24	17,375
Boulder River #3	Cold Spring to mouth	Jan 1 - Dec 31	47	34,026
Halfway Creek	Headwaters to canyon	Jan 1 - Dec 31	1.9	1,376
Hells Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	3.6	2,606
Jefferson River	Headwaters to Madison River	Jan 1 - Dec 31	1,100	796,363
Little Boulder River	Moose Creek to mouth	Jan 1 - Dec 31	7	5,068
North Willow Creek	Hollow Lake Lake to mouth	Jan 1 - Dec 31	7	5,068
South Boulder River	Curly Creek to mouth	Jan 1 - Dec 31	12	8,688
South Willow Creek	Granite Lake to mouth	Jan 1 - Dec 31	14	10,136
Whitetail Creek	Whitetail Reservoir to mouth	Jan 1 - Dec 31	3	2,172
Willow Creek	North and South Willow creeks to mouth	Jan 1 - Dec 31	14	10,136
Willow Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	9.2	6,660

MADISON RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af/yr)
Antelope Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136
Beaver Creek	Wyethia Creek to Earthquake Lake	Jan 1 - Dec 31	937	42,280
Black Sand Spring Creek	Black Sand Spring to SF Madison River	Jan 1 - Dec 31	18.7	13,538
Blaine Spring Creek	Ennis National Fish Hatchery to mouth	Jan 1 - Dec 31	23	16,651
Cabin Creek	Gully Creek to Madison River	Jan 1 - Dec 31	585	28,741
Cherry Creek	Headwaters to mouth	Jan 1 - Dec 31	15	10,859
Cougar Creek	Yellowstone NP boundary to mouth	Jan 1 - Dec 31	24	17,375
Duck Creek	Yellowstone NP boundary to Hebgen Reservoir	Jan 1 - Dec 31	23	16,651
Elk River	Headwaters to mouth	Jan 1 - Dec 31	28	20,271
Grayling Creek	Yellowstone NP boundary to Hebgen Reservoir	Jan 1 - Dec 31	34	24,615
Hot Springs Creek	North and Middle forks to mouth	Jan 1 - Dec 31	5.5	3,982
Indian Creek	Raw Liver Creek to mouth	Jan 1 - Dec 31	48	34,750
Jack Creek	Lone Creek to mouth	Jan 1 - Dec 31	28	20,271
Madison River #1	Yellowstone NP boundary to Hebgen Reservoir	Jan 1 - Dec 31	500	361,983
Madison River #2	Hebgen Dam to West Fork	Jan 1 - Dec 31	800	579,173
Madison River #3	West Fork to Ennis Reservoir	Jan 1 - Dec 31	1,000	723,967
Madison River #4	Ennis Dam to mouth	Jan 1 - Dec 31	1,300	941,157
Moore Creek	Fletcher Creek to mouth	Jan 1 - Dec 31	1.4	1,014
North Meadow Creek	Headwaters to mouth	Jan 1 - Dec 31	18	13,031
O'Dell Creek	Headwaters to mouth	Jan 1 - Dec 31	98	70,949
Red Canyon Creek	Headwaters to Hebgen Reservoir	Jan 1 - Dec 31	2.9	2,100
Ruby Creek	Beartrap Canyon to mouth	Jan 1 - Dec 31	18	13,031
SF Madison River	Dry Canyon to Hebgen Reservoir	Jan 1 - Dec 31	92	66,605
Squaw Creek	North Fork to mouth	Jan 1 - Dec 31	14	10,136
Standard Creek	Headwaters to mouth	Jan 1 - Dec 31	10	7,240
Trapper Creek	Headwaters to Hebgen Reservoir	Jan 1 - Dec 31	3.2	2,317
Watkins Creek	Coffin Creek to Hebgen Reservoir	Jan 1 - Dec 31	5.5	3,982
WF Madison River	Fox Creek to mouth	Jan 1 - Dec 31	957	66,533

Ck - Creek MF - Middle Fork NF - North Fork NP - National Park R - River SF - South Fork WF - West Fork

RED ROCK-BEAVERHEAD DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	AMOUNT REQUESTED (a/yr)
Bear Creek	Headwaters to BLM boundary	Jan 1 - Dec 31	6.5	4,706
Beaverhead River #1	Clark Canyon to East Bench Div Dam at Barretts	Jan 1 - Dec 31	200	144,793
Beaverhead River #2	East Bench Diversion Dam at Barretts to mouth	Jan 1 - Dec 31	200	144,793
Big Sheep Creek	Cabin and Nicholia creeks to mouth	Jan 1 - Dec 31	48	34,750
Black Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	2.5	1,810
Blacktail Deer Creek	MF and WF to County Rd @ T8S R8W Secs 20 & 29	Jan 1 - Dec 31	42	30,407
Bloody Dick Creek	Swift Lake outlet to mouth	Jan 1 - Dec 31	20	14,479
Browns Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	2.3	1,665
Cabin Creek	Headwaters to mouth	Jan 1 - Dec 31	0.4	290
Corral Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344
Deadman Creek	Deadman Lake to mouth	Jan 1 - Dec 31	4.5	3,258
EF Blacktail Deer Creek	Headwaters to mouth	Jan 1 - Dec 31	18	13,031
EF Clover Creek	Headwaters to mouth	Jan 1 - Dec 31	4.4	3,185
EF Dyce Creek	Headwaters to mouth	Jan 1 - Dec 31	1.4	1,014
Frying Pan Creek	Headwaters to mouth	Jan 1 - Dec 31	1.6	1,158
Grasshopper Creek	Blue Creek to mouth	Jan 1 - Dec 31	30	21,719
Hell Roaring Creek	Headwaters to mouth	Jan 1 - Dec 31	15	10,859
Horse Prairie Creek	Headwaters to mouth	Jan 1 - Dec 31	36	26,063
Indian Creek	Headwaters to mouth	Jan 1 - Dec 31	0.2	145
Jones Creek	Headwaters to Lakeview Road crossing	Jan 1 - Dec 31	1.9	1,376
Long Creek	Jones Creek to mouth	Jan 1 - Dec 31	3.4	2,461
Medicine Lodge Creek	Bear Canyon to mouth	Jan 1 - Dec 31	10	7,240
Narrows Creek	Spring in T13S R1E Sec18A to Elk Lake	May 1 - July 15	1.2	869
		July 16 - April 30	0.5	362
Odell Creek	Headwaters to Lower Red Rock Lake	Jan 1 - Dec 31	11	7,964
Peet Creek	Headwaters to reservoir in T14S R4W Sec34A	Jan 1 - Dec 31	0.9	652
Poindexter Slough	Springs & canal T8S R9W Sec3, SW to Beaverhead	Jan 1 - Dec 31	57.9	41,918
Rape Creek	Headwaters to reservoir in T10S R13W Sec4	Jan 1 - Dec 31	0.4	290
Red Rock Creek	Headwaters to Upper Red Rock Lake	Jan 1 - Dec 31	15	10,859
Red Rock River #1	Dam at Lower Red Rock Lake to Uma Reservoir	Jan 1 - Dec 31	55	39,818
Red Rock River #2	Lima Dam to Clark Canyon Reservoir	Jan 1 - Dec 31	60	43,438
Reservoir Creek	Headwaters to mouth	Jan 1 - Dec 31	1.5	1,086
Shenon Creek	Headwaters to BLM boundary in T10S R14W Sec25	Jan 1 - Dec 31	0.4	290
Simpson Creek	Headwaters to mouth	Jan 1 - Dec 31	0.7	507
Tom Creek	Headwaters to Upper Red Rock Lake	Jan 1 - Dec 31	1.4	1,014
Trapper Creek	Headwaters to mouth	Jan 1 - Dec 31	0.7	507
WF Blacktail Deer Creek	Grays and South forks to mouth	Jan 1 - Dec 31	3	2,172
WF Dyce Creek	Headwaters to mouth	Jan 1 - Dec 31	0.7	507

RUBY RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	AMOUNT REQUESTED (a/yr)
Coal Creek	Headwaters to mouth	Jan 1 - Dec 31	3.6	2,606
Cottonwood Creek	Geyser Creek to mouth	Jan 1 - Dec 31	4	2,896
EF Ruby River	Headwaters to mouth	Jan 1 - Dec 31	3	2,172
MF Ruby River	Divide Creek to mouth	Jan 1 - Dec 31	5	3,620
Mill Creek	Outlet of Branham Lake to mouth	Jan 1 - Dec 31	10	7,240
NF Greenhorn Creek	Headwaters to mouth	Jan 1 - Dec 31	3.5	2,534
Ruby River #1	East, Middle, and West forks to Ruby Reservoir	Jan 1 - Dec 31	102	73,845
Ruby River #2	Ruby Dam to mouth	Jan 1 - Dec 31	40	28,959
Warm Springs Creek	<i>Romy</i> Gray Lake outlet to mouth	Jan 1 - Dec 31	48.5	35,112
WF Ruby River	Headwaters to mouth	Jan 1 - Dec 31	3.0	2,172
Wisconsin Creek	Crystal Lake outlet to mouth	Jan 1 - Dec 31	12	8,688

UPPER MISSOURI SUBBASIN

UPPER MISSOURI RIVER AND TRIBUTARIES

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	AMOUNT REQUESTED (a/yr)
Avalanche Creek	Cooney Gulch to Canyon Ferry Reservoir	Jan 1 - Dec 31	5	3,620
Beaver Creek	Headwaters in Elkhorn Mts to Canyon Ferry Reservoir	Jan 1 - Dec 31	2.8	2,027
Beaver Creek	Headwaters in Big Belt Mts to mouth	Jan 1 - Dec 31	10.0	7,240
Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	10.0	7,240
Confederate Gulch	Debauch Gulch to mouth	Jan 1 - Dec 31	5	3,620
Cottonwood Creek	Headwaters to mouth	Jan 1 - Dec 31	1.0	724
Crow Creek	Tizer and Wilson Creeks to Williams Ditch intake	Jan 1 - Dec 31	11	7,964
Deep Creek	Castle Fork to Missouri River	Jan 1 - Dec 31	9	6,516

EF - East Fork MF - Middle Fork NF - North Fork WF - West Fork

Table 1 (continued)

26

Upper Missouri River and Tributaries (continued)

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Dry Creek	Headwaters to Broadwater Missouri Canal	Jan 1 - Dec 31	1.8	1,303	
Duck Creek	Headwaters to Canyon Ferry Res.	Jan 1 - Dec 31	8	5,792	
Little Prickly Pear Ck. #1	Canyon Creek to Clark Creek	Jan 1 - Dec 31	22	15,927	15,927
Little Prickly Pear Ck. #2	Clark Creek to mouth	Jan 1 - Dec 31	70	50,678	50,678
Lyons Creek	Headwaters to mouth	Jan 1 - Dec 31	10.0	7,240	7,240
McGuire Creek	Headwaters to mouth	May 1 - Nov 30	8.3	3,523	
		Dec 1 - Apr 30	4.7	1,408	4,931
Missouri River #1	Jefferson and Madison rivers to Canyon Ferry Res.	Jan 1 - Dec 31	2,400	1,737,520	1,737,520
Missouri River #2	Hauser Dam to Holter Reservoir	Oct 15 - Dec 15	4,878	599,873	
		Dec 16 - Mar 15	3,000	535,537	
		Mar 16 - Apr 30	5,316	485,030	
		May 1 - June 30	7,890	954,624	
		July 1 - Oct 14	3,500	735,867	3,310,931
Missouri River #3	Holter Dam to Great Falls	May 19 - July 5	6,398	609,132	
		July 6 - May 18	4,100	2,577,916	3,187,048
Prickly Pear Creek #1	Rabbit Gulch to Hwy 12 bridge in East Helena	Jan 1 - Dec 31	22	15,927	15,927
Prickly Pear Creek #2	Hwy 12 bridge in East Helena to Lake Helena	Jan 1 - Dec 31	30	21,719	21,719
Sevenmile Creek	Greenhorn Creek and Skelly Gulch to mouth	Jan 1 - Dec 31	1.0	724	724
Silver Creek	Helena Valley Irrigation Canal to mouth	May 1 - Nov 30	13.0	5,518	
		Dec 1 - Apr 30	5.4	1,617	7,135
Sixteenmile Creek	Billy Creek to mouth	Jan 1 - Dec 31	20	14,479	14,479
Spokane Creek	Helena Valley Irr. Canal to mouth	May 1 - Nov 30	4.0	1,698	
		Dec 1 - Apr 30	3.0	898	2,596
Slickney Creek	North and South forks to mouth	Apr 1 - Apr 30	7	417	
		May 1 - May 31	34	2,091	
		June 1 - June 30	35	2,083	
		July 1 - July 31	7	430	5,021
Tenmile Creek	Headwaters to mouth	Jan 1 - Dec 31	12.0	8,688	8,688
Trout Creek	Springs near Vigilante Campground to mouth	Jan 1 - Dec 31	15.0	10,860	10,860
Virginia Creek	Headwaters to mouth	Jan 1 - Dec 31	6.0	4,344	4,344
Wegner Creek	Headwaters to mouth	Apr 1 - Apr 30	8	476	
		May 1 - May 31	41	2,521	
		June 1 - June 30	38	2,261	
		July 1 - July 31	8	492	5,750
Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3.5	2,534	2,534
Wolf Creek	Headwaters to mouth	Jan 1 - Dec 31	7.0	5,068	5,068

DEARBORN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	110	79,636	79,636
Flat Creek	Headwaters to mouth	Jan 1 - Dec 31	7.5	5,430	5,430
MF Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	9.5	6,878	6,878
Sheep Creek	Headwaters of South Fork to mouth	Jan 1 - Dec 31	22	15,927	15,927
SF Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	11.5	8,326	8,326

SMITH RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Big Birch Creek	Headwaters to mouth	Jan 1 - Dec 31	11	7,964	7,964
Eagle Creek	Headwaters to mouth	Jan 1 - Dec 31	2.5	1,810	1,810
Hound Creek	EF Hound Creek and Middle Creek to mouth	Jan 1 - Dec 31	35	25,339	25,339
Newlan Creek	Headwaters to mouth	Jan 1 - Dec 31	3.8	2,751	2,751
NF Deep Creek	Headwaters to rock cascades	Jan 1 - Dec 31	1.0	724	724
NF Smith River	Headwaters to mouth	Jan 1 - Dec 31	9	6,516	6,516
Rock Creek	Headwaters to mouth	Jan 1 - Dec 31	11	7,964	7,964
Sheep Creek	Headwaters to mouth	Jan 1 - Dec 31	35	25,339	25,339
Smith River #1	North and South Forks Sheep Creek	Jan 1 - Dec 31	90	65,157	65,157

EF - East Fork Irr. - Irrigation MF - Middle Fork Res. - Reservoir SF - South Fork

Table 1 (continued)

27

Smith River Drainage (continued)

Smith River #2	Sheep Creek to Hound Creek	Jan 1 - Dec 31	150	108,595	108,595
Smith River #3	Hound Creek to mouth	Jan 1 - Dec 31	80	57,917	57,917
SF Smith River	Headwaters to mouth	Jan 1 - Dec 31	7	5,068	5,068
Tenderfoot Creek	Headwaters to mouth	Jan 1 - Dec 31	15	10,859	10,859

SUN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Elk Creek	Headwaters to mouth	Jan 1 - Dec 31	16	11,583	11,583
Ford Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
NF Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3.0	2,172	2,172
Sun River #1	Diversion Dam to Elk Creek	Jan 1 - Dec 31	100	72,397	72,397
Sun River #2	Elk Creek to mouth	Jan 1 - Dec 31	130	94,116	94,116
Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3	2,172	2,172

BELT CREEK DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Belt Creek #1	Headwaters to Big Otter Creek	Jan 1 - Dec 31	90	65,157	65,157
Belt Creek #2	Big Otter Creek to Missouri River	Jan 1 - Dec 31	35	25,339	25,339
Big Otter Creek	Whiskey Spring Coulee to Belt Creek	Jan 1 - Dec 31	5	3,620	3,620
Dry Fork Belt Creek	Galena and Ott Park Creek to Belt Creek	Jan 1 - Dec 31	7	5,068	5,068
Logging Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	6	4,344	4,344
Pilgrim Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	8	5,792	5,792
Tillinghast Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	5.5	3,982	3,982

MIDDLE MISSOURI SUBBASIN

MIDDLE MISSOURI RIVER AND TRIBUTARIES

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Cow Creek	NF and SF to County bridge	Jan 1 - Dec 31	4.5	3,258	3,258
Highwood Creek	Headwaters to Hwy 228 Bridge at Highwood	Jan 1 - Dec 31	10	7,240	7,240
Missouri River #4	Great Falls to Maris River	Mar 15 - May 18	4,887	630,059	
		May 19 - July 5	11,284	1,074,311	
		July 6 - Aug 31	4,500	508,760	
		Sep 1 - Mar 14	3,700	1,431,075	3,644,205
		Mar 15 - May 18	5,571	718,244	
Missouri River #5	Marlas River to Judith River	May 19 - July 5	14,000	1,332,892	
		July 6 - Aug 31	5,400	610,512	
		Sep 1 - Mar 14	4,300	1,663,140	4,324,788
		Mar 15 - May 18	7,100	915,371	
Missouri River #6	Judith River to upper end of Fort Peck Reservoir	May 19 - July 5	15,302	1,456,851	
		July 6 - Aug 31	5,800	655,735	
		Sep 1 - Mar 14	4,700	1,817,850	4,845,807
		Jan 1 - Dec 31	7	5,068	5,068
Shonkin Creek	Forest boundary to town of Shonkin	Jan 1 - Dec 31	7	5,068	5,068

FORT PECK RESERVOIR TRIBUTARIES

Big Dry Creek	Hwy 200 bridge to mouth	Mar 15 - Mar 31	300	9,521	
		Apr 1 - Apr 30	100	5,950	
		May 1 - May 31	35	2,152	
		June 1 - Oct 31	5.5	1,669	19,292
Little Dry Creek	Whiteside ranch house to Big Dry Creek	Mar 15 - Mar 31	110	3,491	
		Apr 1 - Apr 30	42	2,499	
		May 1 - May 31	17	1,045	
		June 1 - Oct 31	3.5	1,062	8,097

JUDITH RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Beaver Creek	West Fork to Cottonwood Creek	Jan 1 - Dec 31	5	3,620	3,620
Big Spring Creek #1	Fish hatchery to Cottonwood Creek	Jan 1 - Dec 31	110	79,636	79,636
Big Spring Creek #2	Cottonwood Creek to mouth	Jan 1 - Dec 31	100	72,397	72,397
Cottonwood Creek	Spring Branch of Cottonwood Ck. to Big Spring Ck.	Jan 1 - Dec 31	4.5	3,258	3,258

Hwy - Highway NF - North Fork SF - South Fork

Table 1 (continued)

28

Judith River Drainage (continued)

East Fork Big Spring Ck.	Headwaters to Big Spring Creek	Jan 1 - Dec 31	7.5	5,430	5,430
Judith River #1	SF and MF to Big Spring Creek	Jan 1 - Dec 31	25	18,099	18,099
Judith River #2	Big Spring Creek to Missouri River	Jan 1 - Dec 31	160	115,835	115,835
Lost Fork Judith River	SF and WF to MF Judith River	Jan 1 - Dec 31	14	10,136	10,136
Middle Fork Judith River	Headwaters to South Fork	Jan 1 - Dec 31	22	15,928	15,928
South Fork Judith River	Headwaters to Middle Fork	Jan 1 - Dec 31	3.5	2,534	2,534
Warm Spring Creek	Springs to Judith River	Jan 1 - Dec 31	110	79,636	79,636
Yogo Creek	Headwaters to MF Judith River	Jan 1 - Dec 31	3	2,172	2,172

MUSSELSHELL RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Alabaugh Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
American Fork Creek	South Fork to mouth	Jan 1 - Dec 31	5.5	3,982	3,982
Big Elk Creek	at Origin of Lebo Fork to mouth	Jan 1 - Dec 31	9.5	6,878	6,878
Careless Creek	Headwaters to Roberts Creek	Jan 1 - Dec 31	2	1,448	1,448
Checkerboard Creek	East and West Forks to mouth	Jan 1 - Dec 31	6	4,344	4,344
Collar Gulch Creek	Headwaters to mouth	Jan 1 - Dec 31	0.6	434	434
Cottonwood Creek	WF, MF, and Loco Creek to mouth	Jan 1 - Dec 31	16	11,583	11,583
Flatwillow Creek	NF and SF to Petrolia Reservoir	Jan 1 - Dec 31	18	13,031	13,031
Musselshell River #1	NF and SF to Deadmans Basin Div	Jan 1 - Dec 31	80	57,917	57,917
Musselshell River #2	Deadmans Basin Div to Musselshell Div	Jan 1 - Dec 31	80	57,917	57,917
Musselshell River #3	Musselshell Diversion Dam at town of Musselshell to mouth	Jan 1 - Dec 31	70	50,678	50,678
NF Musselshell #1	Headwaters to Bair Reservoir	Jan 1 - Dec 31	3	2,172	2,172
NF Musselshell #2	Bair Reservoir to SF Musselshell R.	Jan 1 - Dec 31	16	11,583	11,583
SF Musselshell	Headwaters to North Fork	Jan 1 - Dec 31	30	21,719	21,719
Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	8	5,792	5,792
Swimming Woman Ck.	Headwaters to City road crossing 8 linear miles upstream from mouth	Jan 1 - Dec 31	2.5	1,810	1,810

MARIAS/TETON SUBBASIN

MARIAS RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Badger Creek	N and S Badger creeks to Forest/Blackfeet Reservation Boundary	Jan 1 - Dec 31	60	43,438	43,438
Birch Creek	Swift Reservoir to Hwy 358	Jan 1 - Dec 31	64	46,334	46,334
Cut Bank Creek	Blackfeet Reservation boundary to mouth	Jan 1 - Dec 31	75	54,297	54,297
Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
Marias River #1	Two Medicine River and Cut Bank Creek to head of Tiber Reservoir	Jan 1 - Dec 31	200	144,793	144,793
Marias River #2	Tiber Dam to Circle Bridge (Hwy 223)	Jan 1 - Dec 31	500	361,983	361,983
Marias River #3	Circle Bridge (Hwy 223) to mouth	Jan 1 - Dec 31	560	405,421	405,421
North Badger Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136	10,136
NF Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
South Badger Creek	Headwaters to mouth	Jan 1 - Dec 31	40	28,959	28,959
SF Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344	4,344
SF Two Medicine River	Headwaters to Forest/Blackfeet Reservation Boundary	Jan 1 - Dec 31	16	11,583	11,583

TETON RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	18	13,031	13,031
McDonald Creek	Headwaters to mouth	Jan 1 - Dec 31	10	7,240	7,240
NF Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	7.2	5,212	5,212
SF Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	6.9	4,995	4,995
Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	4.5	3,258	3,258
Teton River	Headwaters to discharge from Priest Butte Lake	Jan 1 - Dec 31	35	25,339	25,339

LAKES AND SWAMPS

Bean Lake	Sec. 18C and 19B, T18N, R6W, Sec. 13D and 24A, T18N, R7W	Jan 1 - Dec 31	—	2648.6	2648.6
Antelope Butte Swamp	North 1/2 Sec. 28, T26N, R8W	Jan 1 - Dec 31	—	460	460

Ck. - Creek City - County Div - Diversion Hwy - Highway MF - Middle Fork NF - North Fork R - River SF - South Fork WF - West Fork

1 (2) Blacktail Deer Creek - from Middle and West Forks
2 to Zenchiku Land and Livestock's uppermost existing
3 diversion point in SENENE Section 29,T8S,R8W P.M.M.
4 (Stipulation and Agreement between DFWP and
5 Zenchiku Land and Livestock, Inc. dated February
6 10, 1992.

7 5. The instream reservations are for the benefit of the
8 public for fish, wildlife and recreational uses. (DFWP 72155-41A,
9 Bd. Exh. 37-A.1, p. 1-5; DFWP Exh. 10, Graham Dir., p. 2; DFWP Exh.
10 17, Spence Dir., pp. 4 and 5).

11 6. A purpose of the reservations is to preserve the riparian
12 habitats of fish and wildlife populations at the present levels by
13 protecting the quantity and quality of the water. (DFWP 72155-41A,
14 Bd. Exh. 37-A.1, pp. 1-2 and 1-5; DFWP Exh. 10, Graham Dir., pp. 2
15 and 3; DFWP Exh. 17, Spence Dir., pp. 4 thru 6).

16 7. By preserving the fish and wildlife habitats, the instream
17 reservations will protect the diversity of fish and wildlife
18 species comprising the riparian natural resource in the Missouri
19 River Basin above Fort Peck Dam. Fish and wildlife populations and
20 their habitats are inseparable. (DFWP 72155-41A, Bd. Exh. 37-A.1,
21 pp. 1-2 and 1-5; DFWP Exh. 10, Graham Dir., p. 2; DFWP Exh. 17,
22 Spence Dir., pp. 4 and 5).

23 8. A purpose of the instream reservations is to contribute
24 to, and maintain, a clean, healthful and desirable environment and
25 to protect the environmental life support systems of the stream and
26 river systems from degradation. (DFWP 72155-41A, Bd. Exh. 37-A.1,

1 pp. 1-2 thru 1-5; DFWP Exh. 10, Graham Dir., p. 2; DFWP Exh. 17,
2 Spence Dir., pp. 4 thru 6).

3 9. A purpose of the reservations are to help maintain water
4 quality. (DFWP 72155-41A, Bd. Exh. 37-A.1, pp. 1-3 and 1-5; DFWP
5 Exh. 10, Graham Dir., pp. 7 and 8).

6 10. A purpose of the reservations is to provide optimum
7 opportunities for diverse outdoor recreation that are commensurate
8 with the resource protection provided by instream reservations,
9 including simply enjoying or knowing of the existence of a healthy
10 ecosystem. (DFWP 72155-41A, Bd. Exh. 37-A.1, pp. 1-3 thru 1-5;
11 DFWP Exh. 17, Spence Dir., pp. 4 and 5).

12 11. A purpose of the reservations is to help sustain adequate
13 levels of water quality to protect fish and wildlife habitat.
14 (DFWP 72155-41A, Bd. 37-A.1, p. 1-5; DFWP Exh. 10, Graham Dir., pp.
15 2,3,7,and 11; DFWP Exh. 17, Spence Dir., pp. 5 and 6).

16 12. A purpose of the reservations is to help protect, honor
17 and support all existing water rights with a priority before July
18 1, 1985. (DFWP 72155-41A, Bd. Exh. 37-A.1, p. 1-5; DFWP Exh. 10,
19 Graham Dir., pp. 6,7,and 8; DFWP Exh. 17, Spence Dir., pp. 6 and
20 7).

21
22 B. FINDINGS ON THE NEED FOR INSTREAM RESERVATIONS OF WATER
23 APPLIED FOR BY DFWP [SECTION 85-2-316(4)(a)(ii)]

24 13. DFWP and DNRC have both administratively concluded that
25 an instream water right for fish, wildlife, and recreational
26 purposes can be obtained only by application for a reservation and
27 not through a water use permit. (DEIS, Bd. Exh. 40, p. 22; DFWP
28

1 72155-41A, Bd. Exh. 37-A.1, p. 1-6; DFWP Exh. 17, Spence Dir., p.
2 5).

3 14. The temporary water leasing statutes (Sections 85-2-436
4 and 437, MCA) provide for the temporary leasing of consumptive
5 water rights for instream purposes to supplement existing flows,
6 but do not allocate unused water and do not provide an opportunity
7 to preserve the status quo where fisheries values are significant,
8 as reservations would. Water leases are applicable to specific
9 problem areas where the considerable cost of leasing water is
10 justified. (DFWP Exh. 10, Graham Dir., p. 4; DFWP Exh. 17, Spence
11 Dir., p. 5).

12 15. Based on past experience, stream flows will continue to
13 be depleted, increasing the annual occurrence of critically low
14 flows if minimum instream flows are not protected. (DEIS, Bd. Exh.
15 40, Appendix A; DFWP 72155-41A, Bd. Exh. 37-A.1, pp. 1-6; DFWP Exh.
16 10, Graham Dir., p. 11).

17 16. Instream reservations of water in the Missouri basin are
18 needed to meet the basic life requirements of the fish, wildlife,
19 and other living organisms that are dependent upon the flow of the
20 Missouri River and its tributaries. (DFWP 72155-41A, Bd. Exh. 37-
21 A.1, p. 1-6; DFWP Exh. 10, Graham Dir., p. 10; DFWP Exh. 17, Spence
22 Dir., pp. 4 and 5).

23 17. Sufficient instream flows are essential for maintaining
24 viable fish populations at levels commensurate with the stream's
25 biological capabilities. Flow primarily regulates fish abundance
26 through its impact on fish habitat. Fish inhabiting a stream
27 occupy specific habitats which are comprised on many components,
28

1 including a preferred range of water velocities and depths, which
2 are all created by sufficient stream flows. (DFWP 72155-41A, Bd.
3 Exh. 37-A.1, pp. 1-6 and 1-7; DFWP Exh. 17, Spence Dir., pp 5).

4 18. Instream reservations will help preserve the reproductive
5 capacity of streams and rivers. Stream riffles and side channels
6 are typically the prime sites chosen for spawning and the rearing
7 of young. These sites are also the stream habitats that are most
8 sensitive to flow reductions. Consequently, the production of the
9 young recruits that are needed to sustain stream fisheries is
10 strongly tied to the magnitude of the flows. (DFWP 72155-41A, Bd.
11 Exh. 37-A.1, pp. 1-7; DFWP Exh. 17, Spence Dir., p. 5).

12 19. Instream reservations are necessary to protect the food
13 base for fish. All aquatic organisms, including game fish, depend
14 on some lower form of plant or animal for food. These lower forms
15 have specific water requirements necessary to sustain their growth
16 and reproduction. The primary food of Montana stream-dwelling
17 gamefish is aquatic invertebrates which have their greatest
18 production in stream riffles. Riffles are highly sensitive to
19 stream flow reductions. Therefore, the health and well being of
20 game fish populations and, in turn, the quality of the angling
21 experience depend on the maintenance of sufficient riffle habitat
22 to protect the fishes food base. (DFWP 72155-41A, Bd. Exh. 37-A.1,
23 p. 1-7; DFWP Exh. 10, Graham Dir., p. 2; DFWP Exh. 17, Spence Dir.,
24 pp. 5 and 6).

25 20. Instream reservations will help protect the quality of
26 water that is necessary to sustain aquatic organisms and will help
27 prevent the further deterioration of water quality during low flow
28

1 periods. Possible consequences of further lowering streamflows
2 during normal low flow periods are higher water temperatures,
3 increased amounts of dissolved solids, increased nutrient
4 concentrations and lower dissolved oxygen levels, all of which are
5 potentially harmful to aquatic life. (DFWP 72155-41A, Bd. Exh. 37-
6 A.1, pp. 1-7 and 1-8; DFWP Exh. 10, Graham Dir., pp. 2,7 and 8;
7 DFWP Exh. 17, Spence, p. 6).

8 21. Instream reservations will help preserve the Missouri
9 River and its tributaries as important fishing and recreational
10 areas used by the people of Montana and the nation. Approximately
11 one-half of the fishing pressure which occurs in the entire state
12 occurs in the Missouri River basin upstream from Fort Peck Dam.
13 The area is popular for its recreational opportunities and the
14 basin's fisheries values are of outstanding quality. Recreational
15 use of the Missouri basin's water is important to the human
16 experience, providing both enjoyment and relief from day-to-day
17 pressures. (DFWP 72155-41A, Bd. Exh. 37-A.1, p. 1-8; DFWP Exh. 10,
18 Graham Dir., p. 10; DFWP Exh. 17, Spence Dir., p. 4; DFWP Exh. 37,
19 Knudson Dir., pp. 3 thru 8).

20 22. Conservation of native fish species by sustaining their
21 habitat reduces the potential for the species to become listed as
22 threatened and endangered. (DFWP Exh. 10, Graham Dir., p. 10).

23 23. Instream reservations will help preserve the Missouri
24 basin's nationally acclaimed sport fisheries which provide a
25 significant boost to Montana's economy. In 1989, Montana ranked
26 fifth in the nation in the number of nonresident fishing licenses
27 sold. Trout anglers spent about \$50 million in 1985 fishing the
28

1 waters of the Missouri River Basin above Fort Peck Dam. The net
2 economic value of fishing alone in the basin was over \$61.5 million
3 in 1985. Net economic value is the amount people would be willing
4 to spend over what they actually had to spend. The total economic
5 value of streams in the basin would be significantly higher than
6 the amount for fishing alone if other recreational benefits were
7 included, such as floating, camping, picnicking, swimming, bird
8 watching, sightseeing and hunting. These are all popular
9 recreational activities conducted along the Missouri River and its
10 tributaries. (Bd. Exh. 37.A.1, pp. I-9 and I-10; DFWP Exh. 10,
11 Graham Dir., pp. 10 and 11).

12 24. The travel industry adds millions of dollars to the
13 state's economy each year and provides jobs for thousands of
14 Montanans. Without the quality fishing opportunities provided by
15 the Missouri River basin, Montana's tourist industry, a major
16 contributor to the state's economy, would suffer. Angling-related
17 revenues depend on the maintenance of sufficient flows to protect
18 the abundant fish resources that characterize Montana. Continued
19 flow depletions will degrade some of the very resources that draw
20 tourists to Montana. (Bd. Exh. 37-A.1, pp. I-9 and I-10; DFWP Exh.
21 10, Graham Dir., p. 10).

22 25. Instream reservations are needed to preserve a base flow
23 for instream values by protecting the status quo of stream and
24 river flows up to the minimum flows necessary to provide a healthy
25 fishery. The reservations will provide a baseline protection and
26 a priority date for any water that may become available in the
27
28

1 future for use as instream flows. (DFWP Exh. 17, Spence Dir., p.
2 6).

3 26. Instream reservations are need to establish standing for
4 DFWP to object to new water permits and any changes in existing
5 rights that would adversely affect the fishery of a stream
6 protected by an instream reservation. In the Missouri basin, DFWP
7 presently does not have standing to object to new permits or
8 changes based on harmful impacts to the fishery of a stream where
9 DFWP does not have a Murphy Right. This is the same right that all
10 water right holders have for protecting their water rights. (DFWP
11 Exh. 10, Graham Dir., pp. 7 and 9; DFWP Exh. 17, Spence Dir., pp.
12 7 and 8; DFWP Exh. 46, Spence Reb., p. 5).

13
14 (1) Fishery Values

15 27. About 2,739 streams in the Missouri River Basin above
16 Fort Peck Dam support a fishery or have the potential for a
17 fishery. The streams in DFWP's application represent only nine
18 percent (9%) of the total number of streams in the Missouri River
19 Basin above Fort Peck Dam that have fishery values. The streams in
20 DFWP's application include those with the most significant fishery
21 values in the basin. (Spence Dir., DFWP Exh. 17, p. 13; Nelson
22 Cross, Tr. Day 4, pp. 37 and 38).

23 28. In 1989, Trout Magazine ran a special feature article
24 commemorating the magazine's 13th anniversary entitled "America's
25 100 Best Trout Streams." Montana had the highest total of any
26 other state, with 12 streams listed. Six of the streams are in the
27 Missouri basin (Beaverhead, Big Hole, Gallatin, Madison, Missouri
28

1 and Smith rivers). (DFWP 72155-41A, Bd. Exh. 37-A.1, pp. 1-33 and
2 1-34).

4 Gallatin River Sub-basin

5 29. The Gallatin River is nationally recognized for its
6 outstanding wild trout fishery. In 1989, the river supported over
7 65,000 angler-days of use. (Nelson Dir., DFWP Exh. 22, p. 25).

8 30. Reach #1 of the Gallatin River, from the Yellowstone
9 National Park boundary to the confluence of the West Fork Gallatin
10 River, supports an abundance of pan-sized rainbow trout in the 7-10
11 inch class and a few brown trout up to 18 inches. (DFWP 72155-41A,
12 Bd. Exh. 37-A.2, p. 2-481).

13 31. Rainbow trout from 10-14 inches and brown trout in the
14 12-17 inch class are the mainstay of the fishery in Reach #2 of the
15 Gallatin River (from the confluence of the West Fork Gallatin River
16 to the confluence of the East Gallatin River). (DFWP 72155-41A,
17 Bd. Exh. 37-A.2, p. 2-484).

18 32. Reach #3 of the Gallatin River, from the confluence of
19 the East Gallatin River to the river's mouth, is noted for the
20 presence of larger-size brown and rainbow trout, some reaching
21 trophy proportions. (Nelson Dir., DFWP Exh. 22, pp. 25 and 26).

22 33. Cache, Hell Roaring, Porcupine, S.F. Spanish, Spanish,
23 and Squaw Creeks, the Taylor Fork, and the West Fork Gallatin River
24 and its Middle and South forks drain the high peaks of the Gallatin
25 National Forest and feed the canyon stretch of the Gallatin River.
26 These are the most important stream fisheries in the Gallatin
27 Canyon. Rainbow trout are the most abundant species in eight
28

1 streams, brook trout dominate in one (S.F. Spanish Creek), while
2 genetically impure cutthroat trout are most numerous in Cache
3 Creek. (Nelson Dir., DFWP Exh. 22, p. 26).

4 34. South Cottonwood and Big Bear creeks support rainbow,
5 brook and a few cutthroat trout in their mountain headwaters in the
6 Gallatin National Forest. Upper South Cottonwood Creek is one of
7 the Gallatin's outstanding small stream fisheries. (Nelson Dir.,
8 DFWP Exh. 22, p. 26).

9 35. Baker Creek has spring creek-like qualities. High
10 numbers of larger-size brown trout inhabit the lower creek. During
11 the fall, brown trout from the Gallatin River enter the creek to
12 spawn. (Nelson Dir., DFWP Exh. 22, p. 26).

13 36. The East Gallatin River supports robust populations of
14 rainbow and brown trout despite its proximity to the growing urban
15 center of Bozeman. Recent upgrades in Bozeman's sewage treatment
16 plant have allowed the East Gallatin fishery to prosper once again.
17 However, periodic pollution persists. (Nelson Dir., DFWP Exh. 22,
18 p. 26).

19 37. Reach #1 of the East Gallatin River, from the convergence
20 of Rocky and Sourdough creeks to the Bozeman Sewage Treatment Plant
21 outlet, supports substantial numbers of rainbow trout, which
22 occasional reach weights of 3-5 pounds, and 1-2 pound brown trout,
23 with an occasionally trophy of up to 8-9 pounds. Fish populations
24 are subject to periodic fluctuations, a probable consequence of
25 periodic pollution. (DFWP 72155-41A, Bd. Exh. 37-A.2, pp. 2-570
26 through 2-572).

1 38. Reach #2 of the East Gallatin River, from the Bozeman
2 Sewage Treatment plant outlet to the confluence of Thompson Creek,
3 presently supports substantial numbers of brown and rainbow trout
4 for a river of its size. Rainbow trout as large as 5 pounds are
5 present while brown trout typically reach weights of 2 pounds.
6 Fish populations are subject to periodic fluctuations, a probable
7 consequence of periodic pollution. (DFWP 72155-41A, Bd. Exh. 37-
8 A.2, pp. 2-573 through 2-575).

9 39. The trout fishery of Reach #3 of the East Gallatin River
10 (from the confluence of Thompson Creek to the river's mouth), while
11 not the caliber of that in Reaches #1 and #2, is popular with local
12 anglers. Brown trout predominate, followed by rainbow trout and a
13 few brook trout. (DFWP 72155-41A, Bd. Exh. 37-A.2, p. 2-577).

14 40. The main value of Sourdough (Bozeman), Rocky and Bridger
15 creeks - headwater tributaries to the East Gallatin River - rests
16 with their flow contributions, which are needed to dilute urban
17 pollutants that enter at Bozeman and then are passed onto the East
18 Gallatin River, a river with a history of pollution problems.
19 These three tributaries are, in their own right, notable stream
20 trout fisheries. (DFWP 72155-41A, Bd. Exh. 37-A.2, pp. 2-536
21 through 2-546; Nelson Cross, Tr. Day 1, pp. 155 and 156).

22 41. The East and West forks of Hyalite Creek, both within the
23 boundaries of the Gallatin National Forest, provide crucial
24 spawning and rearing habitats for the cutthroat and arctic grayling
25 populations in Hyalite Reservoir. (Nelson Dir., DFWP Exh. 22, p.
26 26).

1 42. Ben Hart, Thompson and Reese creeks are spring-fed creeks
2 that are highly valued for their outstanding fisheries for rainbow
3 and brown trout. (Nelson Dir., DFWP Exh. 22, p. 26).

4 43. Reach #1 of Hyalite Creek (from Middle Creek Dam to the
5 Middle Creek Ditch intake) supports an abundance of small rainbow
6 trout, making it one of the more valued tributaries in the Gallatin
7 drainage. (DFWP 72155-41A, Bd. Exh. 37-A.2, p. 2-555).

8 44. Reach #2 of Hyalite Creek (from the I-90 bridge near
9 Belgrade to the creek's mouth) supports low numbers of rainbow,
10 brown and brook trout. Its fishery value is relatively low. (DFWP
11 72155-41A, Bd. Exh. 37-A.2, p. 2-558).

12 Madison River Sub-basin

13 45. The Madison River is nationally recognized as Montana's
14 premier wild trout river, supporting over 113,000 angler-days of
15 use annually. (Nelson Dir., DFWP Exh. 22, p. 28).

16 46. Reach #1 of the Madison River, which extends from the
17 Yellowstone National Park boundary to Hebgen Reservoir, is mainly
18 noted for its fall fishing, when brown trout leave Hebgen Reservoir
19 for spawning sites in Yellowstone National Park. (Nelson Dir.,
20 DFWP Exh. 22, p. 28).

21 47. Reach #2 of the Madison River, which extends from Hebgen
22 Dam to the confluence of the West Fork Madison River, and Reach #3,
23 from the West Fork Madison River to Ennis Reservoir, provide
24 nationally acclaimed fishing for resident rainbow and brown trout.
25 The downstream portion of Reach #3 also supports a remnant
26

1 population of arctic grayling. (Nelson Dir., DFWP Exh. 22, pp. 28
2 and 29).

3 48. Reach #4 of the Madison River, from Ennis Dam to the
4 river's mouth, suffers in summer from thermal pollution, a
5 consequence of the solar heating of stored water in Ennis
6 Reservoir. Summer heating affects the growth, survival and
7 catchability of trout in Reach #4. Despite unfavorable summer
8 water temperatures, both rainbow and brown trout endure,
9 occasionally reaching densities as high as 6,000 trout per mile in
10 some stretches in some years. Added flow depletions will
11 contribute to the further warming of Reach #4, where thermal
12 pollution has already reached near crisis proportions. Summer
13 water temperature increases as little as one or two degrees could
14 prove fatal to the fishery. (Nelson Dir., DFWP Exh. 22, p. 28;
15 Nelson Obj., DFWP Exh. 3, pp. 2 through 5; and DFWP 72155-41A, Bd.
16 Exh. 37-A.2, p. 2-402).

17 49. Black Sand Spring, Cougar, Duck, Grayling, Red Canyon,
18 Trapper and Watkins creeks and the South Fork Madison River feed
19 Hebgen Reservoir and provide crucial spawning and rearing habitats
20 for the reservoir's self-sustaining trout populations. (Nelson
21 Dir., DFWP Exh. 22, p. 29).

22 50. Beaver and Cabin creeks and the West Fork Madison River,
23 which enter the upper Madison River, are crucial water supplies to
24 the mainstem river when Hebgen Reservoir is filled each year and
25 flow releases into the river are reduced. Their primary fishery
26 value rests with their flow contributions to the upper Madison
27 River. (Nelson Dir., DFWP Exh. 22, p. 29).
28

1 51. Antelope Creek, which feeds Cliff Lake in the Beaverhead
2 National Forest, is a crucial spawning and rearing site for the
3 lake's self-sustaining rainbow trout and the newly introduced Bear
4 Lake strain of cutthroat trout. (Nelson Dir., DFWP Exh. 22, p.
5 29).

6 52. Blaine Spring and O'Dell creeks are valley floor
7 tributaries that, because of their spring creek nature, hold high
8 numbers of brown and rainbow trout. (Nelson Dir., DFWP Exh. 22, p.
9 29).

10 53. Moore Creek, another valley floor tributary, is a
11 potential spawning stream for the remnant grayling population of
12 Ennis Reservoir and the Madison River "channels". (Nelson Dir.,
13 DFWP Exh. 22, p. 29).

14 54. The Elk River, a tributary to the West Fork Madison
15 River, flows entirely within the Beaverhead National Forest and
16 provides a stream rainbow trout fishery in a wilderness setting.
17 (Nelson Dir., DFWP Exh. 22, p. 29).

18 55. Jack, Ruby, Indian, Standard, North Meadow and Squaw
19 creeks drain mountainous national forest lands surrounding the
20 Madison Valley. All are excellent small stream fisheries. (Nelson
21 Dir., DFWP Exh. 22, p. 30).

22 56. Cherry and Hot Springs creeks harbor resident populations
23 of rainbow, brown and some brook trout and support spawning runs of
24 brown trout from the Madison River. (Nelson Dir., DFWP Exh. 22, p.
25 30).

Jefferson River Sub-basin

57. Because of summer irrigation dewatering, trout densities in the Jefferson River are depressed compared to those in the neighboring Madison and Big Hole rivers. Given better summer flows, the Jefferson River's fishery has the potential to equal that of the Big Hole and Madison rivers. The river's brown trout, which commonly reach weights of 1½-2 pounds, support a spring and fall sport fishery that is locally popular with residents of the Butte-Whitehall area. The river's use amounted to 15,260 angler-days in 1989. (Nelson Dir., DFWP Exh. 22, p. 27 and Nelson Cross, Tr. Day 4, pp. 48, 51, 69, 81, 82 and 83).

58. The largest and one of the relatively few tributaries contributing flows to the Jefferson River during the summer irrigation season is the Boulder River. (Nelson Dir., DFWP Exh. 22, p. 27).

59. Reach #1 of the Boulder River (from the convergence of its West and East forks to the confluence of High Ore Creek) provides, the best fishing opportunities on the river. Here, rainbow and brook trout provide a locally important fishery in a small stream setting. (Nelson Dir., DFWP Exh. 22, p. 27).

60. Populations of trout, now dominated by brown trout, are depressed in Reach #2 of the Boulder River (from the confluence of High Ore Creek to Cold Spring), the consequence of channel sedimentation, summer dewatering, and metals pollution. (Nelson Dir., DFWP Exh. 22, p. 27; Nelson Redirect, Tr. Day 4, pp. 80 and 81).

1 61. Spring inflows rejuvenate the lower river, allowing brown
2 trout numbers in Reach #3 of the Boulder River (from the Cold
3 Spring to the river's mouth) to recover to a higher density. A
4 substantial run of brown trout from the Jefferson River enters
5 Reach #3 each fall to spawn. (Nelson Dir., DFWP Exh. 22, p. 27).

6 62. The Little Boulder River, a tributary to the Boulder
7 River, supports good numbers of brown, rainbow and brook trout in
8 its lower segment and provides small stream fishing opportunities
9 of local importance. (Nelson Dir., DFWP Exh. 22, p. 27).

10 63. North and South Willow creeks, which feed Willow Creek
11 Reservoir, support notable fisheries for resident rainbow and brook
12 trout and provide important spawning and rearing habitats for the
13 self-sustaining rainbow trout population of the reservoir. (Nelson
14 Dir., DFWP Exh. 22, pp. 27 and 28).

15 64. Willow Creek, downstream from Willow Creek Reservoir, is
16 a locally renowned rainbow and brown trout fishery. (Nelson Dir.,
17 DFWP Exh. 22, p. 28).

18 65. The South Boulder River supports a substantial trout
19 population, comprised of rainbow, brook and brown trout. (Nelson
20 Dir., DFWP Exh. 22, p. 28).

21 66. Whitetail Creek harbors exceptionally high numbers of
22 brown trout for a small stream of its size. (Nelson Dir., DFWP
23 Exh. 22, p. 28).

24 67. Hells Canyon Creek is one of only two known spawning
25 sites for the depressed rainbow trout population of the Jefferson
26 River. The creek also supports fairly substantial numbers of

1 resident rainbow trout and rainbow x cutthroat hybrids. (Nelson
2 Dir., DFWP Exh. 22, p. 28).

3 68. Willow Spring Creek, a short spring-fed creek on the
4 valley floor, was rehabilitated and successfully developed as a
5 spawning tributary for the Jefferson River's rainbow trout.
6 (Nelson Dir., DFWP Exh. 22, p. 28).

7 69. Halfway Creek is the only stream in the Jefferson River
8 Sub-basin that is known to support a genetically pure population of
9 westslope cutthroat trout. (DFWP 72155-41A, Bd. Exh. 37-A.2, p. 2-
10 354a).

11 Big Hole River Sub-basin

12 70. The Big Hole River is nationally recognized as one of the
13 West's outstanding wild trout fisheries. In 1989, the river
14 supported nearly 40,000 angler-days of use. (Nelson Dir., DFWP
15 Exh. 22, p. 23).

16 71. Reach #1 of the Big Hole River, from the convergence of
17 Warm Springs Creek and the S.F. Big Hole River to the confluence of
18 Pintlar Creek, is the last remaining stronghold of the stream-
19 dwelling or fluvial arctic grayling, a once-common species in
20 Montana's upper Missouri River drainage that is now being
21 considered for threatened or endangered status. (Nelson Dir., DFWP
22 Exh. 22, pp. 23 and 24; Kaya Dir., MTU/AFS Exh. 10, p. 2).

23 72. Reach #2 of the Big Hole River, from Pintlar Creek to the
24 old Divide Dam, is noted for its rainbow trout fishery in its
25 downstream canyon portion. Lesser numbers of brown trout, some of
26 trophy-size, also inhabit the canyon. Upstream from the canyon,
27
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1 all trout numbers decline markedly and brook trout become more
2 prevalent in the catch (Nelson Dir., DFWP Exh. 22, p. 23).

3 73. Reach #3 of the Big Hole River, from the old Divide Dam
4 to the river's mouth, supports robust populations of brown and
5 rainbow trout throughout much of its length, making it the most
6 popular of the three reaches for angling. (Nelson Dir., DFWP Exh.
7 22, p. 23).

8 74. Arctic grayling are found in Francis, Governor, LaMarche,
9 Miner, Mussigbrod, Pintlar, Rock, Steel, Swamp and Wyman creeks and
10 N.F. Big Hole River. Big Lake, Governor, Rock, Steel and Swamp
11 creeks are spawning and rearing sites for river grayling, while
12 Deep and LaMarche creeks are probable spawning sites. Deep Creek
13 is also an important wintering area for river grayling. (Nelson
14 Dir., DFWP Exh. 22, p. 24).

15 75. Westslope cutthroat trout, a "Species of Special Concern"
16 that currently occupies less than eight percent of its historic
17 Montana range, reside in Camp, Delano, Jacobson, Jerry, Moose,
18 Pattengail, Sixmile, Trapper, and Wyman creeks and the Wise River.
19 Westslope cutthroat readily hybridize with rainbow and Yellowstone
20 cutthroat trout, species introduced throughout western Montana.
21 Delano Creek contains pure westslope cutthroat trout which has been
22 verified through genetic testing. (Nelson Dir., DFWP Exh. 22, p.
23 24).

24 76. Birch, Camp, Canyon, Divide, Jerry, Moose, Trapper and
25 Willow creeks provide notable fishing for pan-sized trout. Brook
26 trout predominate in Birch, Camp, Divide and Trapper creeks, while
27 rainbow and rainbow x cutthroat hybrid trout are most numerous in
28

1 Canyon, Jerry, Moose and Willow creeks. A few cutthroat trout and
2 brown trout are also present in some of these streams. (Nelson
3 Dir., DFWP Exh. 22, p. 24).

4 77. American, California, Corral, Deep, French, Oregon,
5 Sevenmile, Seymour, Sixmile, Sullivan, Tenmile and Twelvemile
6 creeks originate on, or flow through, the 56,138-acre Mt. Haggin
7 Wildlife Management Area, owned by DFWP. All support high numbers
8 of pan-sized trout. Brook trout are most abundant in the 12
9 streams. Nine streams also contain rainbow trout, four support
10 rainbow x cutthroat hybrids, and one (Sixmile Creek) has cutthroat
11 trout of unknown genetic purity. (Nelson Dir., DFWP Exh. 22, p.
12 24).

13 78. Reservations are sought for the Wise River and three of
14 its 50+ tributaries (Jacobson, Pattengail, and Wyman creeks).
15 Virtually all of the Wise River drainage is within the confines of
16 the Beaverhead National Forest. Here, the brook trout is the most
17 numerous trout species. Lesser numbers of rainbow, cutthroat and
18 rainbow x cutthroat hybrid trout intermingle with the brook trout.
19 Jacobson Creek is the only known Wise River tributary where
20 cutthroat trout dominate the population. (Nelson Dir., DFWP Exh.
21 22, p. 25).

22 79. Reservations are sought for the North Fork Big Hole River
23 and five of its tributaries (Johnson, Joseph, Mussigbrod, Ruby and
24 Trail creeks). The U.S. Forest Service is the major land holder in
25 the North Fork drainage, except for the North Fork itself which
26 passes entirely through private lands. Brook trout are by far the
27 most numerous trout species. A few of these streams also support
28

1 low numbers of rainbow and rainbow x cutthroat hybrids. (Nelson
2 Dir., DFWP Exh. 22, p. 25).

3 80. Bear, Bryant, Fishtrap, LaMarche and Pintlar creeks are
4 locally noted for their brook trout fishing. These drainages are
5 primarily within mountain forest lands controlled by the USFS.
6 (Nelson Dir., DFWP Exh. 22, p. 25).

7 81. Big Lake, Francis, Governor, Miner, Rock, Steel, Swamp
8 and Warm Springs creeks and S.F. Big Hole River, all brook trout
9 fisheries of local significance, feed the upper Big Hole River.
10 (Nelson Dir., DFWP Exh. 22, p. 25).

11 Ruby River Sub-basin

12 82. The Ruby River supported over 11,000 angler-days of use
13 in 1989, despite limited public access to the river. (Nelson Dir.,
14 DFWP Exh. 22, p. 33).

15 83. Reach #1 of the Ruby River, which extends from the
16 convergence of its East, Middle and West forks to Ruby Reservoir,
17 is, overall, not noted as an exceptional fishery. However, below
18 the confluence of Warm Springs Creek, trout numbers are rated as
19 good. Here, rainbow trout and lesser numbers of brown trout
20 sustain a sport fishery of local importance. (Nelson Dir., DFWP
21 Exh. 22, p. 33).

22 84. Reach #2 of the Ruby River, from Ruby Dam to the river's
23 mouth, provides a notable sport fishery. Brown trout in the 10-14
24 inch class are the mainstay of the fishery. In the fall, large
25 numbers of brown trout from the Jefferson River enter the Ruby
26 River to spawn. (Nelson Dir., DFWP Exh. 22, p. 33).

1 85. The East, Middle and West forks of the Ruby River, all of
2 which harbor rainbow trout, rainbow x cutthroat hybrids and a few
3 cutthroats, support depressed trout populations, the consequence of
4 a sedimentation problem that may be corrected in the future.
5 (Nelson Dir., DFWP Exh. 22, p. 33).

6 86. Coal and N.F. Greenhorn creeks are small, headwater,
7 mountain tributaries in the Beaverhead Forest that harbor westslope
8 cutthroat trout, a "Species of Special Concern" in Montana.
9 (Nelson Dir., DFWP Exh. 22, p. 33).

10 87. The importance of Warm Springs Creek rests with its flow
11 contribution to the Ruby River. The warm, nutrient-laden water of
12 Warm Springs Creek has a positive influence on the aquatic
13 productivity of the river, allowing a 4-7 fold increase in the
14 river's game fish population immediately below the creek's
15 confluence. (Nelson Dir., DFWP Exh. 22, p. 33).

16 88. Cottonwood Creek is, like the three forks of the Ruby,
17 another major tributary impacted by siltation. Low numbers of
18 rainbow and rainbow x cutthroat hybrid trout inhabit the creek.
19 (Nelson Dir., DFWP Exh. 22, p. 33).

20 89. Mill and Wisconsin creeks provide noteworthy small stream
21 fisheries for pan-sized brook trout. (Nelson Dir., DFWP Exh. 22,
22 p. 33).

23 Red Rock - Beaverhead River Sub-basin

24 90. The Red Rock River is one of southwest Montana's lesser
25 known sport fisheries. While angler use is relatively light, the
26

1 river fishery has regional significance. (Nelson Dir., DFWP Exh.
2 22, p. 30).

3 91. Reach #1 of the Red Rock River, from Lower Red Rock Lake
4 to Lima Reservoir, supports brook and cutthroat trout and a few
5 arctic grayling. This reach produces some larger-size brook and
6 cutthroat trout of 3-4 pounds. (Nelson Dir., DFWP Exh. 22, p. 30).

7 92. Reach #2 of the Red Rock River, from Lima Dam to Clark
8 Canyon Reservoir, supports respectable densities of brown and
9 rainbow trout, particularly in its downstream segment, and provides
10 important spawning and rearing habitats for the trout populations
11 of Clark Canyon Reservoir. (Nelson Dir., DFWP Exh. 22, p. 30).

12 93. Corral, Hell Roaring, Odell, Red Rock and Tom creeks,
13 which feed the waters of the Red Rock Lakes National Wildlife
14 Refuge, are important spawning tributaries for the arctic grayling
15 and cutthroat trout populations of the Red Rock Lakes. The streams
16 also harbor good numbers of resident brook trout and some cutthroat
17 trout. (Nelson Dir., DFWP Exh. 22, pp. 30 and 31).

18 94. Narrows Creek, a tributary to Elk Lake in the Centennial
19 Valley, is the sole spawning site for the lake's arctic grayling
20 and provides important spawning habitat for lake-dwelling cutthroat
21 trout. (Nelson Dir., DFWP Exh. 22, p. 31).

22 95. Jones and Peet creeks are populated exclusively with
23 westslope cutthroat trout, a "Species of Special Concern" in
24 Montana. (Nelson Dir., DFWP Exh. 22, p. 31).

25 96. Long Creek holds good numbers of brook trout and
26 hybridized cutthroat trout. (Nelson Dir., DFWP Exh. 22, p. 31).

1 97. East Fork Clover Creek supports above-average numbers of
2 brook trout and lesser numbers of genetically impure cutthroat
3 trout. (Nelson Dir., DFWP Exh. 22, p. 31).

4 98. Bear, Browns Canyon, Cabin, Frying Pan, Indian, Rape,
5 Shenon, Simpson and Trapper creeks are small, extreme headwater
6 tributaries that support westslope cutthroat trout and flow
7 primarily through public lands controlled by the BLM and USFS.
8 (Nelson Dir., DFWP Exh. 22, p. 31).

9 99. Big Sheep Creek, a large spring-fed stream flowing into
10 the Red Rock River, is well known for its brown and rainbow trout,
11 which consistently reach lengths in excess of 20 inches. (Nelson
12 Dir., DFWP Exh. 22, p. 31).

13 100. Deadman Creek, a Big Sheep Creek tributary, is,
14 considering its small size and high elevation, a productive fishery
15 for pan-sized rainbow trout and rainbow x cutthroat hybrids.
16 (Nelson Dir., DFWP Exh. 22, p. 31).

17 101. Black Canyon Creek contains excellent numbers of brook
18 trout, while Bloody Dick and Medicine Lodge creeks, which hold both
19 brook and rainbow trout, support some of the highest trout
20 densities for streams in the Red Rock drainage. (Nelson Dir., DFWP
21 Exh. 22, p. 31).

22 102. Horse Prairie Creek, the second largest tributary to
23 Clark Canyon Reservoir, is populated with brown, brook and rainbow
24 trout. While not noted for an abundance of trout, the creek's
25 fish, particularly the brown trout, reach above-average sizes. The
26 creek also provides spawning habitat for rainbow and brown trout
27 from Clark Canyon Reservoir. (Nelson Dir., DFWP Exh. 22, p. 31).
28

1 103. The Beaverhead River supports substantial fishing
2 pressure, which amounted to 22,700 angler-days in 1989. (DFWP Exh.
3 22, p. 31).

4 104. Reach #1 of the Beaverhead River, which extends from
5 Clark Canyon Dam to the East Bench Diversion Dam, supports a
6 nationally acclaimed trophy trout fishery as well as high numbers
7 of smaller brown and rainbow trout. (Nelson Dir., DFWP Exh. 22, p.
8 31).

9 105. Reach #2 of the Beaverhead River, from the East Bench
10 Diversion Dam to the river's mouth, supports lesser numbers of
11 brown and rainbow trout. The fishery for 14-18 inch trout in the
12 Dillon area is good while the fishery progressively declines as the
13 river approaches its mouth. (Nelson Dir., DFWP Exh. 22, p. 32).

14 106. Brown, rainbow, brook and rainbow x cutthroat hybrid
15 trout reside in lower Grasshopper Creek, where mine pollution and
16 dewatering have damaged the fish community. Above Bannack, the
17 source of the mine pollution, the creek harbors excellent numbers
18 of brook trout. (Nelson Dir., DFWP Exh. 22, p. 32).

19 107. Blacktail Deer Creek holds less than expected trout
20 numbers for a stream of its size. Brook and a few rainbow trout
21 inhabit this stream. (Nelson Dir., DFWP Exh. 22, p. 32).

22 108. The East and West Forks of Blacktail Deer Creek are
23 better fisheries than the mainstem and, overall, provide fair to
24 good fishing for pan-sized brook trout and a few rainbows. The
25 East Fork drainage is entirely within the public domain, mainly the
26 18,000-acre Blacktail Wildlife Management Area owned by DFWP.
27 (Nelson Dir., DFWP Exh. 22, p. 32).
28

1 109. Three small tributaries in the Grasshopper Creek drainage
2 have reservation requests. Reservoir Creek holds genetically pure
3 westslope cutthroat trout. The East and West forks of Dyce Creek
4 support relatively high numbers of brook and rainbow x cutthroat
5 hybrid trout for streams of their size. (Nelson Dir., DFWP Exh.
6 22, p. 32).

7 110. Poindexter Slough is one of Montana's most productive
8 spring-fed creeks, supporting high numbers of rainbow and brown
9 trout. The lower three miles of stream flow through lands owned by
10 DFWP. (Nelson Dir., DFWP Exh. 22, p. 32).
11
12

13 Missouri River Sub-basin Above Canyon Ferry Dam

14 111. Spawning trout from Canyon Ferry Reservoir, which ascend
15 Reach #1 (from the convergence of the Gallatin, Jefferson and
16 Madison rivers to Canyon Ferry Reservoir) of the Missouri River,
17 provide high quality fishing in the stretch of river below Toston
18 Dam. Brown trout, some in the 6-10 pound trophy class, ascend the
19 river from late August through mid-December. In the spring,
20 reservoir rainbow trout, averaging about 17 inches and two pounds,
21 enter the river. About 10,700 angler-days of fishing pressure were
22 expended on Reach #1 in 1989. (Nelson Dir., DFWP Exh. 22, p. 34).

23 112. Sixteenmile Creek is regionally recognized for supporting
24 exceptionally high numbers of rainbow and brown trout in its middle
25 stream segment. (DFWP 72155-41A, Bd. Exh. 37-A.2, pp. 2-587 and 2-
26 588).
27
28

1 113. Avalanche, Beaver, Confederate, Crow, Deep, Dry and Duck
2 creeks are stream fisheries of local importance. Rainbow and
3 rainbow x cutthroat hybrid trout dominate in Avalanche, Crow, Deep,
4 and Dry creeks, while brook trout are most numerous in Beaver,
5 Confederate and Duck creeks. (Nelson Dir., DFWP Exh. 22, p. 34).

6 114. Beaver, Confederate, Deep, Dry and Duck creeks support,
7 in addition to resident trout populations, spring spawning runs of
8 rainbow trout from Canyon Ferry Reservoir. (Nelson Dir., DFWP Exh.
9 22, p. 34)

10 Missouri River Mainstem Below Canyon Ferry Dam
11

12 115. DFWP has requested instream flow reservations on five
13 stream reaches between Canyon Ferry Dam and Fort Peck Reservoir.
14 These are designated as Reaches 2, 3, 4, 5, and 6. (DFWP 72155-
15 41A, Bd. Exh. 37-A.3, pp. 3-6, 3-13, 3-22, 3-28, and 3-33).

16 116. Reach #2 is a free-flowing 3.5 mile segment of the
17 Missouri River between Hauser Dam and Holter Reservoir and is a
18 very popular fishing water. It supports one of the highest
19 densities of rainbow trout found in Montana waters. (DFWP 72155-
20 41A, Bd. Exh. 37-A.3, pp. 3-6 and 3-7).

21 117. Reach #2 is one of the best trout fisheries in Montana
22 during periods when spawning fish migrate from Holter Reservoir to
23 spawn in the short reach of flowing river below Hauser Dam. (Spoon
24 Dir., DFWP Exh. 30, p.3).

25 118. Fish population estimates in Reach #2 show exceptional
26 rainbow trout densities of 3,000 to 6,000 trout per mile have
27 occurred in the last five years. The stream section is also
28

1 particularly noted for producing trophy brown trout up to 12 pounds
2 during the fall spawning period. (Spoon Dir., DFWP Exh. 30, p. 3).

3 119. There is considerable fishing pressure in Reach #2.
4 During October of 1982, 1983 and 1985, when brown trout spawners
5 were concentrated below Hauser Dam, angler use estimates ranged
6 from 810 to 1,049 angler days. During 1983, between March 1 and
7 November 30, an estimated 8,719 angler days were expended on the
8 river. A total of 3,662 actual interviews with anglers were made
9 to derive these estimates. (Spoon Dir., DFWP Exh. 30, pp. 3 and
10 4).

11 120. Reach #2 provides the primary spawning area for brown
12 trout, rainbow trout and kokanee residing in Holter Reservoir.
13 Juvenile fish produced in the river contribute to the fisheries of
14 both the river and the reservoir. (Spoon Dir., DFWP Exh. 30, p.
15 4).

16 121. Spawning habitat in Reach #2 is limited and is confined
17 to four relatively small areas below the dam. The amount of
18 spawning habitat is very much a function of the flow pattern of the
19 river below the dam. The amount of available spawning habitat
20 changes as flows change, and once spawning has occurred, it is
21 critical to maintain adequate flows to ensure that incubating eggs
22 remain adequately covered with water. (Spoon Dir., DFWP Exh. 30 p.
23 5 and Attachment B).

24 122. Kokanee that reside in Holter Reservoir are seasonably
25 abundant in Reach #2 during the fall spawning period and this
26 flowing segment of river is particularly important for meeting
27
28

1 their spawning requirements. (DFWP 72155-41A, Bd. Exh. 37-A.3, p.
2 3-7).

3 123. Reach #3 of the Missouri River is a popular and heavily
4 utilized recreation area between Holter Dam and Great Falls which
5 supports an exceptional wild rainbow and brown trout fishery. From
6 80% to 90% of the existing recreational use is attributed to
7 fishing. Public access is good. A frontage road, officially
8 designated as a state recreation road, parallels much of the river
9 reach downstream to Cascade. There are eight state recreation
10 areas and one fishing access site. From Cascade to Great Falls,
11 there are two additional fishing access sites and an additional
12 state recreation area. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-13;
13 Berg Dir., DFWP Exh. 29, p. 2).

14 124. Electrofishing estimates in Missouri River Reach #3
15 conducted by DFWP in 1988 near Craig showed 4,150 rainbow trout and
16 466 brown trout 10 inches and larger per mile of river. At
17 Cascade, the population declines to 930 rainbow trout and 172 brown
18 trout per mile. From Cascade to Great Falls, trout remain the
19 dominant game fish along with some burbot and walleye. (Berg Dir.,
20 DFWP Exh. 29, p. 2).

21 125. The upper 35 miles of Reach #3, from Holter Dam to
22 Cascade, is designated a Class 1 sport fishery by DFWP and is
23 considered one of Montana's premiere river trout fisheries. (Berg
24 Dir., DFWP Exh. 29, p. 2).

25 126. Angler use in Reach #3 is currently estimated at 88,400
26 angler days per year. From 60% to 70% of these anglers reside in
27 Cascade and Lewis & Clark counties. Most of the angling is in the
28

1 35-mile segment from Holter Dam to Cascade where annual use is
2 estimated at 74,000 angler days per year. Fisherman use of this
3 segment ranks second only to the Madison River statewide. An
4 excellent overall catch rate of 0.40-0.50 rainbow trout per hour,
5 second only to the Madison River, is maintained. (DFWP 72155-41A,
6 Bd. Exh. 37-A.3, p. 3-14).

7 127. Side channels in Reach #3 are important for spawning and
8 rearing of rainbow and brown trout. Side channels are preferred,
9 particularly by brown trout, over the main channel for spawning
10 because of more suitable depth, velocity, substrate and adjacent
11 cover characteristics. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-15).

12 128. Brown trout in Reach #3 initiate spawning in mid-October
13 and young fish emerge from the gravel in early May. Rainbow trout
14 spawn in late March and early April and eggs incubate until mid-
15 May. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-15).

16 129. Rearing of young rainbow and brown trout in Reach #3
17 occurs from mid-May through mid-October when large numbers of young
18 fish move from side channels to the main river. (DFWP 72155-41A,
19 Bd. Exh. 37-41A, pp. 3-15 and 3-16).

20 130. Canada geese nest on islands in Reach #3. The flow
21 quantities around these islands determine whether the nests are
22 protected from mammalian predators. Protective flows are a
23 function of depth, width and velocity of water which inhibit or
24 prevent mammalian predators from crossing onto the islands from the
25 mainland. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-16; Hook Dir.,
26 DFWP Exh. 13, p. 2).

1 131. Reach #4, between Great Falls and the Marias River,
2 supports a highly productive coolwater fishery, with sauger being
3 the predominant game fish. Coldwater game fish species found in
4 this reach include brown and rainbow trout and mountain whitefish.
5 Other game species include burbot and shovelnose sturgeon. (Berg
6 Dir., DFWP Exh. 29, p. 2).

7 132. The upper 21 miles of the Missouri National Wild and
8 Scenic River (which begins at Fort Benton) is included in Reach #4.
9 The Wild and Scenic River receives heavy recreational use in spite
10 of the lack of access points. An average of 21,294 visitor days
11 occurred annually between 1982 and 1986 within the Wild and Scenic
12 corridor. About 30% of this use occurred in Reach #4. Nearly half
13 of the use was in the form of recreational boating. (DFWP 72155-
14 41A, Bd. Exh. 37-A.3, p. 3-22).

15 133. Angler use in Missouri River Reach #4 is currently
16 estimated at 7,692 angler days per year. (Berg Dir., DFWP Exh. 29,
17 p. 2).

18 134. Reach #4 includes the transition zone between cold and
19 warm water fisheries. Brown and rainbow trout and mountain
20 whitefish (coldwater species) are common only in the upper 15 miles
21 of this reach. Although sauger are by far the predominant game
22 fish, walleye appear to be increasing in numbers over the past five
23 years. The sizes of the warmwater game fish are better than the
24 average for river populations within the state, probably due to the
25 Missouri's productivity and the presence of suitable habitat
26 conditions in this reach most of the time. (DFWP 72155-41A, Bd.
27 Exh. 37-A.3, p. 3-23).
28

1 135. In addition to the game fish species, 22 non-game fish
2 species have been identified in this reach. (DFWP 72155-41A, Bd.
3 Exh. 37-A.3, p. 3-23).

4 136. Forage fish are small fish which are utilized as food for
5 larger game and non-game species. Side channels are important
6 habitat areas for forage species in Reach #4. They also provide
7 important rearing habitat for sauger, smallmouth buffalo, bigmouth
8 buffalo and goldeye. Buffalo also utilize side channels for
9 spawning. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-25; Gardner Obj.,
10 DFWP Exh. 5, p. 2).

11 137. Forage fish and young-of-the-year fish use side channel
12 areas from early June through August 31. (DFWP 72155-41A, Bd. Exh.
13 37-A.3, p. 3-25).

14 138. The Missouri River at Fort Benton contributes 80.6% of
15 the median flow of the Missouri River at Virgelle in Reach #5.
16 Paddlefish migration requires 14,000 cfs in Reach #5; therefore,
17 flow in Reach #4 should be maintained at 80.6% of 14,000 cfs or
18 11,284 cfs during the spawning period May 19 - July 5. (DFWP
19 72155-41A, Exh. 37-A.3, p. 3-26).

20 139. Considerable Canada goose nesting occurs on islands in
21 Reach #4. The flow quantities around these islands during the
22 nesting period (March 15 - June 1) determine whether the nests are
23 protected from mammalian predators. (DFWP 72155-41A, Bd. Exh. 37-
24 A.3, pp. 3-25 and 3-26).

25 140. Reach #5, from the Marias River to the Judith River,
26 supports an exceptional warmwater fishery for sauger and shovelnose
27 sturgeon, as well as for burbot, channel catfish, and walleye.
28

1 Shovelnose sturgeon in this reach attain the largest maximum size
2 found anywhere in the United States. (Berg Dir., DFWP Exh. 29, p.
3 3).

4 141. All 67 miles of Reach #5 are within the Upper Missouri
5 National Wild and Scenic River corridor. About 85% of the 21,294
6 annual visitor days occurring in 1982-86 occurred in Reach #5.
7 Nearly half of the use was recreational boating. (DFWP 72155-41A,
8 Bd. Exh. 37-A.3, p. 3-28).

9 142. Paddlefish are important game fish in Reach #5. The
10 paddlefish is listed as a "Species of Special Concern -- Class A"
11 in Montana. The Montana population is one of only six major self-
12 sustaining populations of these ancient and unique fish that remain
13 in the United States. Paddlefish are Montana's largest game fish,
14 with female specimens often reaching five to six feet in length and
15 weighing 75 to 125 pounds. Paddlefish have been significantly
16 reduced over their worldwide range. (DFWP 72155-41A, Bd. Exh. 37-
17 A.1, p. 1-40; DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-17).

18 143. The Missouri River paddlefish population has growth rates
19 that are superior to the other five remaining populations. This
20 population is also older and more secure than those found anywhere
21 else in North America, due largely to the free-flowing
22 characteristics of this river reach which provides essential and
23 irreplaceable spawning areas for paddlefish. (DFWP 72155-41A, Bd.
24 Exh. 37-A.1, pp. 1-40 and 1-41).

25 144. Paddlefish occupy Reach #5 only during the spawning
26 season. Most of their lives are spent in Fort Peck Reservoir.
27 Paddlefish leave the reservoir during high spring flows and migrate
28

1 upstream to spawn, frequently being observed as far upstream as the
2 mouth of the Marias River. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-
3 29).

4 145. Four paddlefish spawning areas have been identified in
5 Reach #5 in the vicinities of Three islands, Virgelle Ferry, Little
6 Sandy Creek and Deadmans Rapids. The spawning period is from May
7 19 through July 5. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-29; Berg
8 Dir., DFWP Exh. 29, p. 3).

9 146. Although paddlefish receive light fishing pressure in
10 Reach #5 because of limited access and low populations, critical
11 paddlefish spawning areas in this reach help sustain the sport
12 fishery for paddlefish on the Charles M. Russell Game Range within
13 Reach #6. (Berg Dir., DFWP Exh. 29, p. 3).

14 147. Two other relics of the dinosaur era - the pallid and
15 shovelnose sturgeons - also occur in Reach #5. Pallid sturgeon are
16 very rare. They occur only as a relic population containing very
17 few numbers in Montana and the species has recently been listed
18 (October 1990) by the U.S. Fish and Wildlife Service as a federal
19 endangered species. (Spence Dir., DFWP Exh. 17, p. 11; Berg Dir.,
20 DFWP Exh. 29, p. 3).

21 148. The shovelnose sturgeon in the Missouri River are healthy
22 and vigorous. Those residing above Fort Peck Reservoir are much
23 larger than those found in other areas of the Missouri and
24 Mississippi basins. The average size of shovelnose from the middle
25 Missouri River equal or exceed the maximum size of those from the
26 other rivers. (DFWP 72155-41A, Bd. Exh. 37-A.1, p. 1-41).

1 149. The paddlefish, pallid sturgeon and sturgeon chub are all
2 fish species residing in Reach #5 which are considered "Species of
3 Special Concern". Pallid sturgeon and sturgeon chub are considered
4 rare throughout their entire geographic range. (DFWP Exh. 29, p.
5 3).

6 150. Side channels are important fish habitats in Reach #5.
7 A side channel is a channel diverging from the main channel and
8 containing less than 20% of the river's flow. In reaches 4, 5 and
9 6, there are about 70 side channels ranging in length from 0.2 to
10 1.4 miles. (Gardner Obj., DFWP Exh. 5, p. 2).

11 151. Side channels in Reach #5 provide important rearing
12 habitat for sauger, bigmouth and smallmouth buffalo and goldeye as
13 well as spawning areas for buffalo. Side channels are also
14 important for production of forage fish. (Gardner Obj., DFWP Exh.
15 5, p. 2).

16 152. Side channels become dewatered when water levels become
17 too shallow to support fish or contain only pools which are
18 disconnected from the main channel due to declining river flow.
19 Sometimes only pools of standing water remain that can eventually
20 dry up or become unsuitable for fish life due to high water
21 temperatures and low dissolved oxygen. The loss of side channel
22 habitat means less food production for fish and fewer numbers of
23 species that depend on the side channels for rearing of young fish,
24 notably the sauger. (Gardner Obj., DFWP Exh. 5, p. 2).

25 153. Riffle habitat is essential for forage food production
26 which includes aquatic insects and small riffle fish such as
27 sculpin, dace and stonecat. (Gardner Obj., DFWP Exh. 5, p. 2).
28

1 154. Considerable Canada goose nesting occurs in Reach #5. An
2 average of 38% of the total nests surveyed between Fort Benton and
3 Fort Peck Reservoir were in Reach #5. Flow levels around goose-
4 nesting islands determine whether the nests will have protection
5 from mammalian predators. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-
6 31 and 3-32).

7 155. Missouri River Reach #6 extends from the Judith River to
8 the upper end of Fort Peck Reservoir. An exceptional warmwater
9 fishery is found in this reach. Paddlefish, sauger, shovelnose
10 sturgeon and channel catfish are the predominant game fish species
11 found throughout the reach. Burbot also occur. (Berg Dir., DFWP
12 Exh. 29, p. 4).

13 156. Six paddlefish spawning areas have been identified in
14 Reach #6 in the vicinities of Holmes Rapids, Dauphine Rapids,
15 Bullwhacker Creek, Cow Island, Two Calf Islands, and Robinson
16 Bridge. These spawning areas are critical for paddlefish
17 recruitment into the sport fishery which occurs on the Charles M.
18 Russell Game Range in the lower 20 miles of this reach. (Berg
19 Dir., DFWP Exh. 29, p. 4).

20 157. There is a significant paddlefish sport fishery on the
21 Charles M. Russell Game Range. Anglers come from a wide geographic
22 area and the sport fishery is of statewide importance. (Berg Dir.,
23 DFWP Exh. 29, p. 4).

24 158. Paddlefish are a "Species of Special Concern" in Montana
25 due to their limited distribution and limited habitat available,
26 but not because of low abundance. Paddlefish populations in
27 Montana are not being adversely affected by angler harvest because
28

1 overall angler success and the average size of paddlefish are not
2 declining. (Berg Dir., DFWP Exh. 29, p. 4).

3 159. Missouri River Reach #6 also contains three other
4 "Species of Special Concern" - the pallid sturgeon, sicklefin chub,
5 and sturgeon chub. All three are rare throughout their
6 geographical range and the pallid sturgeon is a federally
7 endangered species. (Berg Dir., DFWP Exh. 29, pp. 4-5).

8 160. Twenty-three non-game species have been identified in
9 Reach #6. Blue sucker, smallmouth buffalo, bigmouth buffalo, and
10 fresh water drum are four non-game migratory species that are
11 dependent on high spring flows in the Missouri River for successful
12 reproduction. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-35).

13 161. Side channels in Reach #6 are important for forage fish
14 production and rearing areas for sauger, goldeye, smallmouth
15 buffalo and bigmouth buffalo. Water level conditions in side
16 channels are related to main river flow. (DFWP 72155-41A, Bd. Exh.
17 37-A.3, p. 3-36).

18 162. Paddlefish residing in Fort Peck Reservoir and the
19 Missouri River require a flow of 15,302 cfs in Reach #6 to initiate
20 their annual spring spawning migration from May 19 through July 5.
21 (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-37; Berg Dir., DFWP Exh. 29,
22 p. 6)

23 163. A fair amount of Canada goose nesting occurs on the
24 Missouri River in Reach #6. An average of 13% of the total nests
25 surveyed between Fort Benton and Fort Peck Reservoir are within
26 this reach. Flow levels around goose-nesting islands determine
27 whether the nests will have protection against mammalian predators.
28

1 The goose-nesting period is March 15 - June 1. (DFWP 72155-41A,
2 Bd. Exh. 37-A.3, pp. 3-36 and 3-37).

3
4 Hauser/Holter Reservoir Sub-basins

5 164. DFWP has requested instream flow reservations on ten
6 Missouri River Basin tributaries between Canyon Ferry and Holter
7 dams. These streams are: Spokane Creek, McGuire Creek, Trout
8 Creek, Prickly Pear Creek, Sevenmile Creek, Tenmile Creek, Silver
9 Creek, Beaver Creek, Willow Creek, and Cottonwood Creek. (DFWP
10 72155-41A, Bd. Exh. 37-A.3, pp. 3-39 to 3-81).

11 165. Spokane Creek, McGuire Creek and Trout Creek are all
12 spring-like streams that flow into Hauser Lake. Spokane Creek
13 contains brown and rainbow trout, kokanee and mountain whitefish.
14 Brown trout, kokanee and mountain whitefish migrate from Hauser
15 Reservoir into Spokane Creek to spawn. McGuire Creek contains
16 brown and rainbow trout and kokanee. The creek also provides
17 important spawning habitat for rainbow and brown trout and kokanee
18 migrating from Hauser Reservoir. Trout Creek contains brown and
19 rainbow trout, kokanee and mountain whitefish. The stream contains
20 good populations of resident brown and rainbow trout. In addition,
21 Trout Creek is a spawning and rearing tributary for brown and
22 rainbow trout and kokanee migrating from Hauser Reservoir. (DFWP
23 72155-41A, Bd. Exh. 37-A.3, pp. 3-41, 3-42, 3-44, 3-47 and 3-48;
24 Lere Dir., DFWP Exh. 14, p. 4).

25 166. Trout Creek is the most important tributary for spawning
26 and rearing of kokanee, brown trout, mountain whitefish and rainbow
27 trout that migrate from Hauser Reservoir. Spawning rainbow and
28

1 brown trout up to 9 pounds have been collected. It is also an
2 important rearing stream for juveniles of these salmonids. Trout
3 Creek also contains a good resident fish population of rainbow and
4 brown trout. Bald eagles concentrate at the mouth of Trout Creek
5 during the fall kokanee spawning season. Trout Creek is a
6 designated public viewing area for the fall congregation of bald
7 eagles. (Lere Dir., DFWP Exh. 14, pp. 5 and 6).

8 167. Silver Creek is a spring-like stream entering Lake
9 Helena. It contains brown, rainbow and brook trout and kokanee.
10 It also provides spawning and rearing habitat for these species
11 which migrate from Hauser Reservoir and Lake Helena. (DFWP 72155-
12 41A, Bd. Exh. 37-A.3, pp. 3-67 and 3-68).

13 168. Prickly Pear Creek flows into Lake Helena. Sevenmile and
14 Tenmile creeks are tributaries to Prickly Pear Creek. Tenmile and
15 Sevenmile creeks provide fisheries for rainbow trout and brook
16 trout. Brown trout are found in the lower portion of Tenmile
17 Creek. Game fish populations in both streams are greater in
18 upstream sections because of dewatering of the lower reaches.
19 (Lere Dir., DFWP Exh. 14, p. 8; DFWP 72155-41A, Bd. Exh. 37-A.3,
20 pp. 3-59 through 3-60 and 3-64 through 3-65).

21 169. Prickly Pear Creek Reach #1 (Rabbit Gulch to East Helena)
22 supports a relatively good resident trout population of rainbow and
23 brown trout. The upper section of this reach contains a good brook
24 trout population. In addition to the resident fishery, this reach
25 also provides spawning habitat for rainbow and brown trout that
26 migrate out of the Lake Helena - Hauser Reservoir complex. The
27 reach has important recreational values due to its close proximity
28

1 to the Helena area. (Frazer Dir., DFWP Exh. 26, p. 21; DFWP 72155-
2 41A, Bd. Exh. 37-A.3, pp. 3-52 and 3-53).

3 170. Prickly Pear Creek Reach #2 (East Helena to Lake Helena)
4 supports a resident population of brown and rainbow trout. Brown
5 and rainbow trout from the Lake Helena - Hauser Reservoir complex
6 also migrate through this reach to spawn. It has a high
7 recreational value because of its close proximity to Helena.
8 (Frazer Dir., DFWP Exh. 26, p. 22; DFWP 72155-41A, Bd. Exh. 37-A.3,
9 p. 3-56).

10 171. Beaver Creek, Willow Creek and Cottonwood Creek are all
11 tributaries to Holter Lake. Beaver Creek is the most important
12 tributary for spawning and rearing of rainbow trout that migrate
13 from Holter Reservoir as well as from the 3.5 mile section of
14 Missouri River between Hauser Dam and Holter Reservoir. Extensive
15 rainbow spawning occurs in Beaver Creek during the spring high flow
16 period and they provide an excellent fishery at that time. Brown
17 trout from the Missouri River occasionally use Beaver Creek for
18 spawning in the fall. There are also resident populations of
19 rainbow, brown and cutthroat trout which provide a good fishery in
20 Beaver Creek. (Lere Dir, DFWP Exh. 14, p. 6; DFWP 72155-41A, Bd.
21 Exh. 37-A.3, pp. 3-70 and 3-71).

22 172. Cottonwood and Willow creeks contain rainbow, brown and
23 brook trout that provide a moderate fishery. Migrant rainbow and
24 brown trout and kokanee from Holter Reservoir sometimes use these
25 two streams for spawning. (Lere Dir., DFWP Exh. 14, p. 7; DFWP
26 72155-41A, Bd. Exh. 37-A.3, pp. 3-74, 3-75, 3-78 and 3-79).

Little Prickly Pear Creek Sub-basin

173. Reach #1 of Little Prickly Pear Creek (Canyon Creek to Clark Creek) supports a good resident trout population consisting of brown, rainbow and brook trout, and mountain whitefish. Brown trout are the dominant trout species. The lower end of Reach #1 also provides important spawning and rearing habitat for the extremely popular Blue Ribbon trout fishery in the Missouri River below Holter Dam. (Frazer Dir., DFWP Exh. 26, DFWP, p. 13).

174. An estimated 15,000 rainbow trout spawn in Little Prickly Pear Creek. There is also a large, unquantified brown trout spawning run. (Leathe Dir., DFWP Exh. 20, p. 7; Frazer Dir., DFWP Exh. 26, p. 15).

175. Reach #2 of Little Prickly Pear Creek (Clark Creek to mouth) supports a resident trout fishery dominated by rainbow trout, with lesser numbers of brown trout and brook trout. It is an important recreation area between Helena and Great Falls and supports heavy public use. (Frazer Dir., DFWP Exh. 26, p. 14).

176. Reach #2 of Little Prickly Pear Creek also provides important spawning and rearing habitat for rainbow and brown trout that migrate out of the Missouri River. A majority of the spawning and rearing occurs in Reach #2. (Frazer Dir., DFWP Exh. 26, pp. 14 and 15).

177. Virginia Creek, Canyon Creek, Lyons Creek and Wolf Creek are tributaries to Little Prickly Pear Creek. These four streams have resident fish populations consisting of rainbow, brown and brook trout. Lyons Creek and Wolf Creek also are important spawning streams for migratory rainbow and brown trout from the

1 Missouri River and Little Prickly Pear Creek. Rearing of the young
2 fish from these migratory spawners also occurs in these streams.
3 (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-101 through 3-107; Frazer
4 Dir., DFWP Exh. 26, pp. 17, 28 and 39).

5 178. Virginia and Canyon Creeks contain resident populations
6 of brook, rainbow and brown trout. Brook trout comprise 76% of the
7 population in Virginia Creek. Rainbow trout make up 49% of the
8 population in Canyon Creek, with brook and brown trout equally
9 providing the remaining 51%. These two streams provide moderate to
10 good fisheries for these resident salmonids. The Canyon Creek
11 fishery is very popular with local anglers. (Lere Dir., DFWP Exh.
12 14, p. 8; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-93 through 3-98).

13 Dearborn River Sub-basin

14 179. The Dearborn River is a tributary to the Missouri River
15 below Holter Dam and is one of the most important trout streams in
16 Montana. It is known to have good fishing for resident trout
17 (mostly rainbow) in the 8-12 inch range, particularly in its upper
18 reaches. Brown trout are found in the lower river and will average
19 somewhat larger than the rainbow. Brook trout are present in the
20 headwaters. The Dearborn provides up to 2,500 angler-days of
21 fishing annually. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-118;
22 Leathe Dir., DFWP Exh. 20, p. 5).

23 180. In addition to its resident fishery, the Dearborn is an
24 important spawning tributary for rainbow trout that reside in the
25 Missouri River. The results of a spring 1988 spawning survey
26 indicated that the Dearborn River is the most important spawning
27
28

1 stream for rainbow trout which inhabit the Missouri River between
2 Holter Dam and Cascade. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-
3 119; Leathe Dir., DFWP Exh. 20, pp. 5 through 7).

4 181. Fish trapping and a helicopter survey of the Dearborn
5 River in the spring of 1988 confirmed that large numbers of rainbow
6 trout utilized the stream for spawning. Over 2,300 mature rainbow
7 trout, averaging 14.9 inches in length, were captured and marked.
8 It was estimated that approximately 20,000 rainbows use the
9 Dearborn River for spawning. During the April helicopter survey of
10 the lower 42 miles of the Dearborn, approximately 6,000 spawning
11 nests (redds) were counted. Spawning rainbows were observed on
12 many redds. Spawning areas were easily identified because of the
13 abnormally low water and good visibility occurring under near-
14 drought conditions. Most spawning was concentrated in the lower 30
15 miles of river. (Leathe Dir., DFWP Exh. 20, p. 6; DFWP 72155-41A,
16 Bd. Exh. 37-A.3, pp. 3-118 and 3-119).

17 182. Tag returns by anglers fishing the Missouri River
18 confirmed that the rainbow spawners in the Dearborn River were
19 inhabitants of the Missouri River. (Leathe Dir., DFWP Exh. 20, p.
20 6).

21 183. Spawning habitat in the Dearborn River is critical to the
22 perpetuation of the Missouri River fishery. The Dearborn is one of
23 only three tributaries to the Missouri River where Missouri River
24 fish spawn. The other two streams are Sheep Creek and Little
25 Prickly Pear Creek, but the Dearborn is the most heavily used
26 spawning stream. (Leathe Dir., DFWP Exh. 20, p. 7).

1 184. During the fall, a substantial mountain whitefish
2 spawning run utilizes the Dearborn River. (DFWP 72155-41A, Bd.
3 Exh. 37-A.3, p. 3-119).

4 185. Instream flow requests have been made for the Middle and
5 South forks of the Dearborn River and Flat Creek. The Middle and
6 South forks of the Dearborn both have very good rainbow trout
7 populations. Numbers of rainbows longer than three inches range
8 between 350 and 400 per thousand feet of stream. The Middle Fork
9 contains rainbows up to 16 inches long. Rainbow trout from the
10 Dearborn River also use the Middle and South Forks for spawning
11 only in their lower reaches. Beaver dams apparently limit upstream
12 fish migration of these 12-16 inch fish. This size fish is
13 uncommon in these streams and no such sized fish were observed
14 above beaver dam barriers in the stream. (Leathe Dir., DFWP Exh.
15 20, p. 8).

16 186. Flat Creek has relatively low trout populations but is
17 the most heavily fished of the three tributary streams. Fishing
18 pressure is approximately 340 angler-days per year. Flat Creek
19 contains rainbow, brook and brown trout, and mountain whitefish.
20 (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-130 and 3-131).

21 187. Wegner Creek and Stickney Creek are tributaries to the
22 Missouri River near the town of Craig. The lower reaches of both
23 streams are intermittent and flows only reach the Missouri River
24 during spring runoff periods. Although both streams support
25 resident rainbow trout populations in upstream sections, their
26 principal value lies in their being spawning streams. During
27 spring runoff, both streams are important spawning streams for
28

1 Missouri River rainbow trout when flows are available. When
2 natural spring flows occur during good water years, spawning
3 rainbow trout are able to migrate through the normally dewatered
4 sections and reach the perennial flowing sections upstream.
5 (Frazer Dir., DFWP Exh. 26, pp. 26 and 27; DFWP 72155-41A, Bd. Exh.
6 37-A.3, pp. 3-109, 3-110, 3-112 and 3-113).

7 Sheep Creek (Missouri River)

8
9 188. Sheep Creek flows directly into the Missouri River near
10 Cascade 24 miles downstream from Holter Dam. It is a critically
11 important spawning stream for rainbow trout that reside in the
12 Missouri River. (Leathe Dir., DFWP Exh. 20, p. 9).

13 189. Approximately 3,500 to 4,400 rainbow spawners, averaging
14 about 16 inches long, migrate into Sheep Creek each year to spawn.
15 Brown trout and mountain whitefish also migrate from the Missouri
16 River to spawn in Sheep Creek. (Leathe Dir., DFWP Exh. 20, p. 9).

17 190. Tag returns by anglers fishing the Missouri River show
18 that spawning rainbow in Sheep Creek inhabit the Missouri River
19 from four miles upstream to 15 miles downstream from the mouth of
20 Sheep Creek. Sheep Creek is the most important spawning area for
21 rainbows residing in this portion of the Missouri River. (Leathe
22 Dir., DFWP Exh. 20, p. 10).

23 191. Sheep Creek contains a resident population consisting of
24 rainbow, brown and brook trout and provides up to 800 angler-days
25 of use each year. However, its principal importance is as a
26 spawning tributary for the Missouri River. (DFWP 72155-41A, Bd.
27 Exh. 37-A.3, pp. 3-134 and 3-135).
28

Smith River Sub-basin

192. The Smith River is one of the most popular trout fisheries in the state. An average of over 12,000 anglers per year fished the Smith River with about two-thirds of the use above the mouth of Hound Creek. The Smith River has been managed as a wild trout fishery since trout stocking was discontinued in 1974. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-142 and 3-143).

193. Three stream reaches have been established by DFWP on the Smith River. Rainbow, brown, brook and cutthroat trout and mountain whitefish and burbot are present in all three reaches. Rainbow trout are the predominant species present in all three reaches, followed by brown trout and whitefish. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-143, 3-146 and 3-149).

194. The most popular fishing on the Smith River is the 60-plus mile scenic floating section between Camp Baker (at the mouth of Sheep Creek) and Eden Bridge (below Hound Creek). Fishing comprises one of the most important activities while floating this stretch of river. Access to this reach is gained almost exclusively by floating. Floating is currently limited to about mid-April through the first week in July in an average water year. When streamflow at the USGS gauge above Sheep Creek at Camp Baker is 100 cfs or less, floating becomes difficult and interest drops off. Sheep Creek contributes flow just below the boat launch site and this flow is necessary to successfully float when the Smith River above Sheep Creek reaches its minimum level of 100 cfs. (Spence Obj., DFWP Exh. 4, p. 6; Wipperman Dir., DFWP Exh. 21, p. 3; DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-143).

1 195. An instream flow in the Smith River will maintain the
2 existing rainbow and brown trout populations in the river and
3 maintain habitat for spawning and rearing of game fish and the
4 production of aquatic food organisms used by rainbow and brown
5 trout. Maintenance of existing habitat and trout populations will
6 continue to provide a quality experience for outdoor recreation
7 associated with the river. (Wipperman Dir., DFWP Exh. 21, p. 3).

8 196. DFWP has filed instream flow requests on 10 tributaries
9 to the Smith River. These are the South Fork Smith River, North
10 Fork Smith River, Newlan Creek, Big Birch Creek, Sheep Creek, Eagle
11 Creek, Rock Creek, Tenderfoot Creek, North Fork Deep Creek and
12 Hound Creek. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-151 through
13 3-186).

14 197. All of the 10 Smith River tributaries support significant
15 trout populations and comprise an important fishery resource. Most
16 of the streams provide a few hundred days of fishing recreation
17 each year and a few sustain more than one thousand angler-days in
18 some years. (Leathe Dir., DFWP Exh. 20, p. 3).

19 198. Rainbow and brook trout tend to predominate in the Smith
20 River tributaries, with the largest fish typically ranging from 11-
21 14 inches long. Brook trout populations are especially high in the
22 South Fork Smith River, Big Birch Creek and in Newlan Creek. Sheep
23 Creek has an exceptional rainbow trout population above Moose Creek
24 with more than 900 fish per 1,000 feet of stream. Rock Creek and
25 Tenderfoot Creek also have outstanding rainbow and/or hybrid
26 cutthroat trout populations. Eagle Creek supports populations of
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1 rainbow, cutthroat and brook trout. (Leathe Dir., DFWP Exh. 20, p.
2 3).

3 199. The North Fork of Deep Creek contains a genetically pure
4 westslope cutthroat trout population (a "Species of Special
5 Concern" in Montana). This is the only species occupying the reach
6 of stream where instream flows have been requested. Rock outcrops
7 form natural barriers that prevent the upstream migration of hybrid
8 cutthroat trout from the South Fork into the North Fork of Deep
9 Creek. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-182).

10 Sun River Sub-basin

11 200. Sun River Reach #1 begins at Diversion Dam below Gibson
12 Reservoir and flows for 32 miles downstream to the confluence of
13 Elk Creek. The present trout fishery is rated as fair and there
14 has been a considerable amount of angler use over the years.
15 Rainbow and brown trout and mountain whitefish are the principal
16 game fish species in Reach #1. Brown trout become more abundant in
17 the lower portion of this reach. Sizes of trout and whitefish are
18 about average compared to other populations in the state. (Gardner
19 Dir., DFWP Exh. 36, p. 3; DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-
20 192).

21 201. Reach #1 of Sun River contains brown trout and whitefish
22 which average about 11 inches in length, with some brown trout
23 reaching up to 23 inches; rainbow trout average about 8 inches with
24 some specimens reaching nearly 18 inches in length. Reach #1 of
25 the Sun River experiences severe dewatering during the summer
26 irrigation season. Inadequate streamflows and elevated water
27
28



1 temperatures have suppressed the trout fishery in this reach.
2 There is an excellent potential for improving the fishery if
3 adequate instream flows could be provided. (DFWP 72155-41A, Bd.
4 Exh. 37-A.3, pp. 3-192).

5 202. Sun River Reach #2 extends from Elk Creek to the mouth.
6 The present fishery is rated as fair for the majority of this
7 section and there has been a considerable amount of angler-use over
8 the years. Brown and rainbow trout, mountain whitefish, northern
9 pike and burbot are found in this reach. Brown trout are the most
10 abundant game fish. Whitefish are fairly common in the upper half
11 of the reach, while rainbow trout are uncommon in the lower river.
12 A small population of northern pike and burbot reside in the lower
13 25 miles of this reach. The average size of brown and rainbow
14 trout and whitefish are 14 inches, 12 inches and 10 inches,
15 respectively, with some brown trout reaching 23 inches in length
16 and some rainbow reaching 17 inches. The brown trout population is
17 well represented by large-sized fish. Rainbow trout and whitefish
18 sizes are about average compared to other populations in the state.
19 (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-195; Gardner Dir., DFWP Exh.
20 36, p. 3).

21 203. DFWP has requested instream flows on four tributaries to
22 the Sun River. These are North Fork Willow Creek, Willow Creek,
23 Ford Creek and Elk Creek. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-
24 198 through 3-209).

25 204. The principal fish species in these four tributaries are
26 brook trout, followed by rainbow and brown trout. Brook trout
27 comprise 100% of the game fish in North Fork Willow Creek and
28

1 provide a good fishery for people in the local area. Brook trout
2 range up to 12 inches in length. Willow Creek contains mostly
3 brook trout with some rainbow trout also present. Brook trout can
4 range up to 12 inches in length. A pure strain of westslope
5 cutthroat trout, a "Species of Special Concern" in Montana, occurs
6 in the upper reaches of Willow Creek. Ford Creek supports an
7 excellent brook trout population and is an important fishery in the
8 area. The fishery is approximately 90% brook trout and 10% rainbow
9 and cutthroat trout. Brook trout up to 1.25 pounds have been
10 recorded. Elk Creek has one of the most important trout fisheries
11 in the Augusta area and includes rainbow, brown and brook trout.
12 The brook trout are somewhat more abundant in the upper reaches.
13 (Hill Dir., DFWP Exh. 35, pp. 4 and 5; DFWP 72155-41A, Bd. Exh. 37-
14 A.3, pp. 3-198 through 3-209).

15 Belt Creek Sub-basin

16 205. Belt Creek Reach #1 (headwaters to Big Otter Creek) has
17 a very good trout fishery. The fishery is comprised of rainbow,
18 brown, brook and cutthroat trout and mountain whitefish. Rainbow
19 trout are the predominant fish throughout the reach, followed by
20 whitefish and brown trout. Cutthroat and brook trout are not as
21 common in the mainstem as they are in some of the tributary streams
22 and headwater areas. Average size of rainbow and brown trout and
23 whitefish is 7 inches, 10 inches and 13 inches, respectively. Belt
24 Creek receives a substantial amount of fishing pressure due to its
25 convenient access and close proximity to Great Falls.
26 Approximately 8,000 angler-days of use has occurred annually in
27
28



1 recent years. Approximately 3,000 catchable rainbow trout are
2 stocked annually in the lower end of Reach #1 because an adequate
3 self-sustaining trout population cannot be maintained. (Gardner
4 Dir., DFWP Exh. 36, p. 3; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-
5 214 and 3-215).

6 206. Belt Creek Reach #2 (Big Otter Creek to Missouri River)
7 has a moderate cold water and warm water fishery. Fish species
8 present include sauger, rainbow trout, brown trout and mountain
9 whitefish. A marginal resident trout fishery exists in this reach
10 because of low stream flows, high temperatures and siltation.
11 Rainbow trout are the most common species found. Brown trout occur
12 throughout the reach but in fewer numbers. Some spawning by
13 rainbow and brown trout from the Missouri River occurs in Belt
14 Creek during their spawning seasons. Mountain whitefish also
15 migrate into Belt Creek from the Missouri River to spawn. Sauger
16 migrate up Belt Creek from the Missouri River during the late
17 spring and reside in the stream until fall as long as flow
18 conditions are adequate. Sauger range from 12-16 inches in length.
19 (Gardner Dir., DFWP Exh. 36, p. 3; DFWP 72155-41A, Bd. Exh. 37-A.3,
20 p. 3-217).

21 207. DFWP has requested instream flows on five tributaries to
22 Belt Creek. These are: Dry Fork Belt Creek, Tillinghast Creek,
23 Pilgrim Creek, Logging Creek and Big Otter Creek. (DFWP 72155-41A,
24 Bd. Exh. 37-A.3, pp. 3-220 through 3-238).

25 208. These five Belt Creek tributary streams contain various
26 mixtures of rainbow, cutthroat, brown and brook trout. The maximum
27 sizes range from about 9 inches for rainbow trout up to 19 inches
28

1 for brown trout. Brook and cutthroat trout reach sizes of 13
2 inches and 10 inches, respectively. Dry Fork Belt Creek
3 populations appear to be less abundant than those of nearby streams
4 due in part to the toxic affect of heavy metals pollution from old
5 mines. However, good instream flows and habitat conditions occur
6 and there is a good potential for trout fishery restoration when
7 these abandoned mines are reclaimed. Tillinghast Creek has a very
8 good trout fishery with a light amount of angler use because of its
9 remote location and somewhat restricted access. Brook trout are
10 the most abundant game fish. Pilgrim Creek is unique because the
11 trout population is comprised entirely of cutthroat trout.
12 Cutthroat numbers are very good and the fishery receives a moderate
13 amount of angler use. Logging Creek has a very good trout fishery
14 with a moderate amount of angler use. Brook trout are the most
15 abundant game fish, followed by rainbow and brown trout. Total
16 numbers of brook and rainbow trout were 1,183 trout per mile, an
17 abundant fish population for small streams in this area. Fishing
18 pressure is moderate, except where considerable use occurs at a
19 forest service campground. Big Otter Creek has an uncommon spring-
20 like aquatic system and a good trout fishery containing
21 exceptionally large-sized brown trout for a creek of this size.
22 Brown trout are the predominant fish found throughout Big Otter
23 Creek, followed by brook and rainbow trout. The stream receives a
24 considerable amount of angler use. (Gardner Dir., DFWP Exh. 36,
25 pp. 3 and 4; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-220 through 3-
26 246).



Highwood Creek

209. Highwood Creek is a tributary to the Missouri River. This creek has an excellent trout fishery and considerable fishing pressure. Brook, rainbow, cutthroat and brown trout occupy the stream, with brook trout being the predominant fish throughout the reach. Rainbow trout are common but less numerous. Cutthroat trout are confined to the headwater areas and brown trout have been noted only in the lower portions of the reach. Brook and rainbow trout reach 11 and 12 inches in length, respectively. (Gardner Dir., DFWP Exh. 36, p. 4; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-239 and 3-240).

Shonkin Creek

210. Shonkin Creek is a Missouri River tributary that has an excellent trout fishery consisting primarily of brook trout and a few rainbow trout. This productive creek is one of only two principal trout streams found in Chouteau County and receives a fair amount of angler use, mostly by local residents. There are an estimated 1,890 brook trout per mile of stream, an especially abundant fish population for streams in this area. (Gardner Dir., DFWP Exh. 36, p. 4; DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-244).

Marias River Sub-basin

211. Reach #1 of the Marias River (above Tiber Reservoir) has a fair warmwater fishery and is an important spawning stream for walleye from Tiber Reservoir. Some coldwater species (rainbow trout and mountain whitefish) also inhabit this reach, but are in lower numbers. Other species include burbot, northern pike and

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1 channel catfish. Walleye up to 28 inches in length, whitefish up
2 to 17 inches, rainbow up to 22 inches, burbot up to 16 inches and
3 northern pike up to 33 inches have been found in this reach.
4 (Gardner Dir., DFWP Exh. 36, p. 6; DFWP 72155-41A, Bd. Exh. 37-A.3,
5 p. 3-253).

6 212. The average walleye size in Marias River Reach #1 is
7 fairly large for a river population. The river reach also provides
8 rearing habitat for young walleye. Large rainbow trout (average of
9 2 pounds) occupy the river mainly in the spring and early summer,
10 preferring Tiber Reservoir during the rest of the year. (DFWP
11 72155-41A, Bd. Exh. 37-A.3, p. 3-253).

12 213. Angler use of Marias River Reach #1 is moderate to light,
13 most likely due to its remote and fairly inaccessible location.
14 (Gardner Dir., DFWP Exh. 36, p. 6; DFWP 72155-41A, Bd. Exh. 37-A.3,
15 p. 3-254).

16 214. Marias River Reach #2 from Tiber Dam to Circle Bridge on
17 Highway 223 consists of a 21-mile cold water trout fishery that
18 produces trophy-sized brown trout. Deep, cold water releases from
19 Tiber Dam provide conditions that are favorable for rainbow and
20 brown trout. Stream trout fisheries are uncommon in northcentral
21 Montana and the Marias river is, therefore, of special value. This
22 21-mile tailwater fishery below Tiber Dam is the only trout stream
23 within a 50-mile radius and receives a moderate amount of angler
24 use. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-258; Gardner Dir.,
25 DFWP Exh. 36, p. 6).

26 215. Reach #2 of the Marias River contains mountain whitefish,
27 rainbow trout, brown trout, sauger, walleye, northern pike, and
28

1 burbot. Whitefish are the most abundant game fish in the reach and
2 occur in high numbers. Rainbow and brown trout occur in fair
3 numbers and attain exceptionally large sizes. The other species
4 occur in lower numbers. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-
5 257).

6 216. Marias River Reach #2 contains rainbow trout up to 22
7 inches, brown trout up to 32 inches, sauger up to 22 inches,
8 walleye up to 23 inches, northern pike up to 47 inches and burbot
9 up to 32 inches in length. The reach also contains 14 nongame fish
10 species. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-257 and 3-258).

11 217. Marias River Reach #3 extends from Circle Bridge to the
12 mouth. This reach has an excellent resident and migratory
13 warmwater fishery. Resident species include sauger, walleye,
14 channel catfish and smallmouth bass. Migratory species from the
15 Missouri River include shovelnose sturgeon, blue sucker, walleye,
16 sauger and channel catfish. This reach contains sauger up to 22
17 inches, whitefish up to 17 inches, shovelnose sturgeon up to 43
18 inches, walleye up to 28 inches, channel catfish up to 31 inches,
19 burbot up to 18 inches, and brown trout up to 16 inches in length.
20 The maximum sizes of adult shovelnose sturgeon surpass most other
21 known size data for the species and underscore the value of this
22 high quality population. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-
23 261 and 3-262).

24 218. Blue sucker, smallmouth buffalo, bigmouth buffalo, and
25 fresh water drum are the migratory species found in Reach #3 of the
26 Marias River during their spawning seasons. They reside in the
27 Missouri River during the rest of the year. There are also 16
28



1 nongame fish which are residents of Reach #3. (DFWP 72155-41A, Bd.
2 Exh. 37-A.3, p. 3-262).

3 219. The central location of the warmwater fishery in Marias
4 River Reach #3 makes it especially attractive for residents of the
5 western part of the state, where trout fishing is the major
6 activity. The lower six miles of this reach receive intensive
7 angling pressure during the spring spawning season. Moderate
8 angler use occurs during the rest of the year. (Gardner Dir., DFWP
9 Exh. 36, p. 7; DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-262).

10 220. DFWP has requested instream flows on nine tributaries to
11 the Marias River. These are: Birch Creek, South Fork Dupuyer
12 Creek, North Fork Dupuyer Creek, Dupuyer Creek, South Badger Creek,
13 North Badger Creek, Badger Creek, South Fork Two Medicine River and
14 Cut Bank Creek. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-265
15 through 3-291).

16 221. These nine Marias River tributary streams contain
17 mixtures of brook, rainbow, westslope cutthroat trout and mountain
18 whitefish. In addition to those species, Cut Bank Creek contains
19 brown trout and burbot. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-
20 265 through 3-291).

21 222. South Fork Dupuyer, North Fork Dupuyer, South Badger,
22 North Badger and Badger creeks, and South Fork Two Medicine River
23 all contain westslope cutthroat trout, a "Species of Special
24 Concern" in Montana. Westslope cutthroat trout are found mostly in
25 the headwaters of these tributary streams which arise on the east
26 slope of the continental divide. Westslope cutthroat comprise 100%
27 of the fish populations in these streams above natural barriers
28

1 which prevent other species from mixing with these populations.
2 (Hill Dir., DFWP Exh. 35, pp. 5 through 7; DFWP 72155-41A, Bd. Exh.
3 37-A.3, pp. 3-267 through 3-288).

4 223. Brook trout are the principal species in Birch Creek and
5 Dupuyer Creek. Specimens up to one pound have been taken in
6 Dupuyer Creek. These two streams also contain rainbow trout and
7 whitefish. (Hill Dir., DFWP Exh. 35, pp. 5 and 6; DFWP 72155-41A,
8 Bd. Exh. 37-A.3, pp. 3-265, 3-266 and 3-275).

9 224. Cut Bank Creek is an important fishery because it is the
10 only trout stream readily available to persons in the Cut Bank
11 area. Brown trout, introduced in 1965, have established a self-
12 sustaining population. Catchable rainbow trout are stocked
13 annually to supplement a few wild rainbow. (DFWP 72155-41A, Bd.
14 Exh. 37-A.3, p. 3-290).

15 Teton River Sub-basin

16 225. The Teton River basin supports an abundance of fish and
17 wildlife that provides good fishing and hunting. Native westslope
18 cutthroat trout are found in headwater streams. Rainbow, brook and
19 brown trout occur in the middle to upper reaches of several
20 streams, while sauger, burbot, channel catfish and northern pike
21 are found in the lower Teton River. (DFWP 72155-41A, Bd. Exh. 37-
22 A.3, p. 3-294).

23 226. DFWP has requested an instream flow in the Teton River
24 only from its headwaters to the discharge from Priest Butte Lake
25 near Choteau. Brook, brown and rainbow trout, and mountain
26 whitefish are the principal game fish in this reach, with the
27
28

1 latter three providing a significant fishery in the lower portion
2 of the reach. (Hill Dir., DFWP Exh. 35, p. 8; DFWP 72155-41A, Bd.
3 Exh. 37-A.3, p. 3-295).

4 227. The Teton River provides a trout fishery for the people
5 in the local area. Above Choteau, 90% of the fishery is small
6 brook trout with fewer numbers of brown and rainbow trout and
7 mountain whitefish. These are mostly pan-sized fish. (DFWP 72155-
8 41A, Bd. Exh. 37-A.3, p. 3-296).

9 228. Below Choteau, the fishery is mostly brown trout,
10 followed by whitefish and rainbow trout. Brown trout up to 22
11 inches, whitefish up to 21 inches and rainbow trout up to 18 inches
12 in length have been taken in this reach. (DFWP 72155-41A, Bd. Exh.
13 37-A.3, pp. 3-296 and 3-297).

14 229. DFWP has requested instream flows on five tributaries to
15 the Teton River. These are: McDonald Creek, South Fork Deep
16 Creek, North Fork Deep Creek, Deep Creek and Spring Creek. (DFWP
17 72155-41A, Bd. Exh. 37-A.3, pp. 3-300 through 3-312).

18 230. McDonald Creek provides a good fishery for small brook
19 trout, the only game species present. South Fork Deep, North Fork
20 Deep, Deep and Spring creeks contain both brook and rainbow trout.
21 Deep Creek also contains brown trout up to 14 inches in length, as
22 well as whitefish. Westslope cutthroat trout are also found in
23 South Fork Deep, North Fork Deep and Deep creeks. (Hill Dir., DFWP
24 Exh. 35, pp. 8 through 9; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-
25 300 through 3-312).

26 231. Spring Creek is very important to the community of
27 Choteau because it flows right through town. Annual plants of
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1. Insert into the folder the following documents:

2. of the report of the investigation of the accident.

3. Copy of the report of the investigation of the accident.

4. Copy of the report of the investigation of the accident.

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1 catchable rainbow trout are made within the town of Choteau for a
2 children's fishing area. (Hill Dir., DFWP Exh. 35, p. 9).

3 Judith River Sub-basin

4 232. The Judith River is the third largest tributary to the
5 Missouri River between Canyon Ferry Dam and Fort Peck Reservoir.
6 It is a popular recreation area for fishing, hunting, picnicking,
7 hiking and floating. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-315
8 and 3-316).

9 233. Judith River Reach #1 (South and Middle forks to Big
10 Spring Creek) has a very good trout fishery that receives a
11 considerable amount of angler use. Large brown trout are found in
12 this reach during the fall spawning season. Brown trout are the
13 predominant game fish, followed by mountain whitefish and rainbow
14 trout. An excellent population of brook trout exists in the upper
15 portion of Reach #1. Low numbers of cutthroat trout also occur in
16 the upper portion of this reach. (Gardner Dir., DFWP Exh. 36, p.
17 5; DFWP 72155-41A, Bd. DFWP Exh. 37-A.3, p. 3-317).

18 234. The upper portion of Judith River Reach #1 contains an
19 estimated 1,420 trout per mile, which is an abundant fish
20 population for streams typical of this area. Brook trout up to 13
21 inches, brown trout up to 20 inches, and rainbow trout up to 15
22 inches in length have been taken in this reach. (DFWP 72155-41A,
23 Bd. Exh. 37-A.3, p. 3-317).

24 235. Judith River Reach #2 (Big Spring Creek to its mouth) has
25 a fair fishery for both warmwater and coldwater species. It is an
26 important spawning tributary for Missouri River channel catfish.
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1 Other game fish species present include sauger, mountain whitefish,
2 brown trout, rainbow trout, smallmouth bass, walleye, cisco and
3 burbot. (Gardner Dir. DFWP Exh. 36, p. 5; DFWP 72155-41A, Bd. Exh.
4 37-A.3, p. 3-320).

5 236. In Judith River Reach #2, sauger and channel catfish are
6 the most abundant game fish. Sauger up to 24 inches and channel
7 catfish up to 32 inches in length are present. Twelve nongame
8 species also occur in this reach. (DFWP 72155-41A, Bd. Exh. 37-
9 A.3, p. 3-320).

10 237. The lower Judith River (Reach #2) has a diverse fishery
11 which reflects the variety of habitat conditions present and the
12 transition from a coldwater to a warmwater environment. This reach
13 receives only a light amount of fishing pressure, most likely due
14 to its remote and fairly inaccessible location. (Gardner Dir.,
15 DFWP Exh. 36, p. 5; DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-321).

16 238. DFWP has requested instream flows on nine tributaries to
17 the Judith River. These are: South Fork Judith River, Lost Fork
18 Judith River, Middle Fork Judith River, Yogo Creek, Big Spring
19 Creek, East Fork Big Spring Creek, Beaver Creek, Cottonwood Creek
20 and Warm Spring Creek.

21 239. South Fork Judith, Lost Fork Judith, Middle Fork Judith
22 and Yogo creeks, all of which are headwater tributaries to the
23 Judith River, contain very good to fair populations of pan-size
24 rainbow, brook and cutthroat trout and mountain whitefish. Rainbow
25 and brook trout are predominant. Middle Fork Judith River also
26 contains a few brown trout. (Gardner Dir., DFWP Exh. 36, pp. 5 and
27 6; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-324 through 3-338).
28

1 240. South Fork Judith River receives a considerable amount of
2 angler use, whereas Middle Fork, Lost Fork and Yogo creeks receive
3 moderate to light fishing pressure. (Gardner Dir., DFWP, Exh. 36,
4 pp. 5 and 6; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-324 through 3-
5 338).

6 241. Big Spring Creek is one of the largest spring-fed streams
7 in the state. The majority of the flow originates from a large
8 spring located approximately nine miles southeast of Lewistown.
9 The stream is high in dissolved solids, exceptionally productive
10 and, for its size, rated as one of Montana's finest fishing waters.
11 Local sportsmen and tourists consider the stream to be the most
12 important trout stream in central Montana. (DFWP 72155-41A, Bd.
13 Exh. 37-A.3, pp. 3-341, 3-342 and 3-343).

14 242. The productive nature of Big Spring Creek is due to
15 stable year-round flows provided by the large spring; stable water
16 temperatures in the mid-50's at the spring which provide optimum
17 trout growth; productive water rich in dissolved solids from
18 underground limestone formations which provide for good food
19 production and fish growth; and the relatively stable banks, stream
20 channel and well-developed riparian zone which provide trout
21 habitat. (Poore Dir., DFWP, Exh. 15, p. 3).

22 243. Big Spring Creek Reach #1 (from the state fish hatchery
23 to Cottonwood Creek) contains primarily rainbow and brown trout
24 with rainbow making up a majority of the population. A few brook
25 trout and whitefish also occur. Up to 245 rainbow trout per mile
26 15 inches and longer, and up to 125 brown trout per mile 15 inches
27 and longer, have been found in Big Spring Creek. Reach #1 has also
28

1 produced many fish over 10 pounds and several between 18 and 20
2 pounds. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-343 and 3-344;
3 Poore Dir., DFWP Exh. 15, p. 3).

4 244. Big Spring Creek Reach #1 receives substantial angler
5 use. Between 1982-86, an average of 11,000 angler-days of use
6 occurred on this reach. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-
7 344).

8 245. Big Spring Creek Reach #2 (from Cottonwood Creek to the
9 mouth) contains brown trout, rainbow trout, mountain whitefish and
10 sauger. Whitefish are the most common salmonids, followed by
11 rainbow and brown trout. Sauger are found in this reach when they
12 move in from the Judith River, probably to spawn. (DFWP 72155-41A,
13 Bd. Exh. 37-A.3, p. 3-347).

14 246. Fishing pressure on Big Spring Creek Reach #2 is much
15 less than Reach #1, but still substantial. An average annual use
16 of 3,200 angler days occurred between 1982-86. (DFWP 72155-41A,
17 Bd. Exh. 37-A.3, p. 3-347).

18 247. DFWP has requested instream flows on three tributaries to
19 Big Spring Creek. These are: East Fork Big Spring Creek, Beaver
20 Creek and Cottonwood Creek. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp.
21 3-350 through 3-360).

22 248. These three Big Spring Creek tributaries contain pan-size
23 rainbow, brook and brown trout. Rainbow are the predominant fish
24 in the East Fork, brook trout in Beaver Creek and brown trout in
25 Cottonwood Creek. Brown trout up to 17 inches and two pounds have
26 been taken from Beaver Creek. All three streams have good to
27 moderate trout fisheries with moderate to light angler use.
28



1 (Gardner, Dir., DFWP Exh. 36, p. 5; DFWP 72155-41A, Bd. Exh. 37-
2 A.3, pp. 3-350 through 3-360).

3 249. Warm Spring Creek flows directly into the Judith River
4 and has the potential to provide one of the best smallmouth bass
5 fisheries in the state. Because of its productivity and diversity
6 of fish and invertebrate species, Warm Spring Creek is one of the
7 most unique streams in the state. (Poore Dir., DFWP Exh. 15, p.
8 6).

9 250. To some degree, the same factors which make Big Spring
10 Creek so productive also apply to Warm Spring Creek: Stable stream
11 flow, stable water temperatures, high dissolved solids and channel
12 and bank stability. (Poore Dir., DFWP Exh. 15, pp. 6 and 7).

13 251. Warm Spring Creek contains rainbow, brown and brook
14 trout, smallmouth bass, sauger and channel catfish. Rainbow are
15 the most abundant game fish. Brown trout are less abundant but
16 reach larger size (up to 20 inches and averaging 17 inches). (DFWP
17 72155-41A, Bd. Exh. 37-A.3, p. 3-363).

18 252. Warm Spring Creek also contains smallmouth bass which are
19 growing well and reproducing. Smallmouth bass were introduced
20 because water temperatures are somewhat excessive for natural
21 reproduction of rainbow and brown trout. The lower end of Warm
22 Spring Creek also contains sauger and channel catfish which
23 originate from the Judith River. (Poore Dir., DFWP Exh. 15, p. 6).

24 253. Warm Spring Creek receives an average of 1,200 angler
25 days per year. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-364).
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Cow Creek

254. Cow Creek is a northern tributary to the Missouri River. DFWP has requested flows on two miles of Cow Creek from the confluence of the North and South forks to the county bridge near T.U. Reservoir. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-367).

255. Brook trout are the only game fish present in this reach of Cow Creek. However, they occur in large numbers (4,187 fish per mile). Brook trout are mostly pan-size but range up to 12 inches in length. (DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-367 and 3-368).

256. This reach of Cow Creek provides year-round habitat for brook trout as well as being the primary spawning areas for fish inhabiting downstream beaver ponds. Cow Creek has an excellent trout fishery and fishing pressure is light. (Gardner Dir., DFWP Exh. 36, p. 4; DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-368).

Musselshell River Sub-basin

257. The Musselshell River is 364 miles long and is one of Montana's longest rivers. It is characterized by three fishery habitat types: 1) coldwater in the upper 55 miles; 2) coldwater/warmwater transitional zone for 146 miles; and 3) a classic warmwater prairie stream for 163 miles. Each reach has unique fishery qualities. (Fredenberg Dir., DFWP Exh. 27, pp. 2 and 3).

258. Musselshell River Reach #1 (from the confluence of the North and South forks to Deadmans Basin Diversion Dam) is a brown trout stream with abundant bank cover, deep pools and a dense riparian zone. Historically, when sufficient flows are present,

1 Musselshell Reach #1 has provided large fish, with brown trout over
2 five pounds not uncommon. Drought conditions between 1985 and 1988
3 produced a decline in the brown trout population. (Fredenberg
4 Dir., DFWP Exh. 27, p. 3; DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-
5 376).

6 259. The fishery potential of Musselshell Reach #1, given
7 adequate flows, could be similar to the fishery of the East
8 Gallatin River. In the East Gallatin, trout populations commonly
9 reach 400-500 trout per 1,000 feet of stream, with individual brown
10 trout weighing up to 10 or 12 pounds. Currently, Musselshell Reach
11 #1 is achieving much less than half of its potential. (Fredenberg
12 Dir., DFWP Exh. 27, p. 4).

13 260. Musselshell River Reach #2 (a 146-mile section from
14 Deadmans Basin Diversion downstream to Musselshell Diversion) is a
15 transitional zone between a coldwater and warmwater fishery. The
16 trout fishery found in Reach #1 ends abruptly below Deadman's
17 Diversion due to chronic dewatering and trout are, therefore, not
18 a factor in the fishery of this reach. (Fredenberg Dir., DFWP Exh.
19 27, p. 4).

20 261. In Musselshell Reach #2, smallmouth bass are presently
21 the most important game fish. A very poor fishery exists
22 throughout Reach #2 due to dewatering and water quality
23 degradation. (Fredenberg Dir., DFWP Exh. 27, p. 5; DFWP 72155-41A,
24 Bd. Exh. 37-A.3, p. 3-383).

25 262. Musselshell Reach #2 contains a peculiar minnow, the
26 northern redbelly dace x finescale dace hybrid, which is classified
27 as a "Species of Special Concern" in Montana due to its limited
28



1 numbers and habitat. This hybrid fish is a parthenogenetic
2 species, which means that all of the individuals are female and
3 they reproduce exact clones of the mother through development of an
4 unfertilized egg. (Fredenberg Dir., DFWP Exh. 27, p. 5; DFWP
5 72155-41A, Bd. Exh. 37-A.3, p. 3-383).

6 263. Musselshell River Reach #3 extends for 163 miles from the
7 Musselshell Diversion to its mouth at Fort Peck Reservoir. This
8 reach has significant fishery values and represents the free-
9 flowing, warmwater portion of the Musselshell River. (Fredenberg
10 Dir., DFWP Exh. 27, p. 5; DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-
11 386).

12 264. Musselshell Reach #3 contains sauger, channel catfish,
13 smallmouth bass, black bullhead, northern pike and walleye. This
14 reach is a very important spawning tributary for channel catfish,
15 sauger and smallmouth bass from Fort Peck Reservoir because
16 irrigation withdrawals are minimal and there are no barriers to
17 upstream migration in this 163 miles of river. (Fredenberg Dir.,
18 DFWP Exh. 27, p. 6; DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-387).

19 265. Musselshell Reach #3, despite its remote location, had
20 about 4,600 fisherman days of use in 1989. (Fredenberg Dir., DFWP
21 Exh. 27, p. 6).

22 266. DFWP requested instream flows on 11 tributaries to the
23 Musselshell River. These are: South Fork Musselshell River,
24 Alabaugh Creek, Cottonwood Creek, North Fork Musselshell River,
25 Checkerboard Creek, Spring Creek, Big Elk Creek, American Fork
26 Creek, Careless Creek, Swimming Woman Creek and Flatwillow Creek.

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(DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-390 through 3-436 and 3-440 through 3-443).

267. All of the requested Musselshell River tributaries except Careless, Swimming Woman and Flatwillow creeks are in Reach #1 of the Musselshell River. (DFWP 72155-41A, Bd. Exh. 37-A.3, p. 3-372).

268. South Fork Musselshell, Alabaugh Creek and Cottonwood Creek all contain rainbow, brook and brown trout. Brown trout are the dominant species in these three streams. All three streams provide good to excellent fisheries and produce some large fish. Brown trout up to 18 inches are present and specimens up to four pounds have been taken. (Frazer Dir., DFWP Exh. 26, pp. 4, 10 and 23; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-390 through 3-402).

269. North Fork Musselshell Reach #1 (above Bair Reservoir) contains an excellent pan-size brook trout population along with a few rainbow trout. Bair Reservoir is a barrier to all fish movement from downstream reaches of the North Fork. (Frazer Dir., DFWP Exh. 26, p. 18; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-406 through 3-412).

270. Checkerboard Creek supports an excellent trout fishery comprised mostly of brook trout, with lesser numbers of rainbow and brown trout. Brook and rainbow trout over 12 inches long are present. Spring Creek is a good fishery for pan-sized brook and rainbow trout. Big Elk and American Fork creeks provide good fisheries for brook and brown trout. Brook trout predominate in the upper reaches and brown trout in the lower reaches. Both streams contain brown trout up to 14 inches in length. Careless

1 and Swimming Woman creeks both contain brook trout and are
2 important local fisheries. (Frazer Dir., DFWP Exh. 26, pp. 8 and
3 25; Fredenberg Dir., DFWP Exh. 27, pp. 7 and 8; DFWP 72155-41A, Bd.
4 Exh. 37-A.3, pp. 3-414, 3-418, 3-421 and 3-422, 3-425 and 3-426, 3-
5 430, 3-433 and 3-434).

6 271. Flatwillow Creek is the largest drainage emerging from
7 the Snowy Mountains and, as such, is the best stream trout fishery
8 in Petroleum County and surrounding locale. The stream contains
9 brown, rainbow and brook trout. The mainstem of Flatwillow Creek
10 above U.S. Highway 87 is a high quality trout stream that has
11 regional importance. Brown trout are the predominant fish,
12 followed by rainbow and brook trout. Brown trout up to 24 inches
13 long have been taken from this stream reach. (Frendenberg Dir.,
14 DFWP Exh. 27, p. 6; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-441 and
15 3-442).

16 Collar Gulch

17 272. Collar Gulch is a small tributary to Fords Creek which
18 originates in the Judith Mountains about 12 miles northeast of
19 Lewistown. This stream contains a small population of genetically
20 pure westslope cutthroat trout, a "Species of Special Concern" in
21 Montana, which have survived in the isolated perennial headwaters
22 of the stream for many years. Cutthroat up to 10 inches in length
23 are present. (Poore Dir., DFWP Exh. 15, p. 8; DFWP 72155-41A, Bd.
24 Exh. 37-A.3, pp. 3-437 through 3-439).



Big Dry and Little Dry Creeks

273. Big Dry and Little Dry creeks are both low-gradient prairie streams. Little Dry Creek is a tributary to Big Dry Creek. Both streams contain channel catfish and walleye. Catfish are residents of the stream system and walleye are migratory species from Fort Peck Reservoir. Walleye are one of the most popular game fish in Fort Peck Reservoir. Walleye gather in the reservoir near the mouth of Big Dry Creek each spring and, if spring flows allow, they will migrate up Big Dry Creek 30 to 35 miles to spawn. They also migrate eight miles up Little Dry Creek to spawn. Walleye eggs, larvae and young-of-the-year fingerlings have all been collected in Big and Little Dry creeks when high spring flows coincide with the normal walleye spawning period. Therefore, Big Dry and Little Dry creeks are important spawning and rearing areas for walleye when flows are available. (Frazer, DFWP Exh. 26, pp. 6, 7, 11 and 12; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-445, 3-446, 3-448 and 3-449).

Bean Lake

274. Bean Lake is a natural lake located 15 miles southwest of Augusta in Lewis and Clark County. It is the only natural lake of any significance in all of northcentral Montana. It is a popular recreation area and provides nearly 10,000 angler days of fishing per year. It is one of the few lakes and reservoirs which have public access and where the waters are not committed for other uses such as irrigation. Bean Lake has no water inflow; water supply is entirely from precipitation, ground water and seepage. It is an

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1 important rainbow trout fishery with a satisfactory catch rate and
2 some older trout being taken in excess of four pounds. (Wipperman
3 Dir., DFWP Exh. 21, pp. 5 and 6; DFWP 72155-41A, Bd. Exh. 37-A.3,
4 pp. 3-451 through 3-453).

5 Antelope Butte Swamp

6 275. Antelope Butte Swamp is part of the Blackleaf Wildlife
7 Management Area lying approximately 14 miles west of Bynum in Teton
8 County. The swamp is a perennial wetland area of approximately 240
9 acres, which is fed by Noname Creek and a private diversion from
10 Muddy Creek. The area is managed by DFWP as a winter range for
11 migratory wildlife such as elk and mule deer. It has a diversity
12 of plant communities which provide year-round and seasonal habitats
13 for whitetail and mule deer, elk, black and grizzly bear, wolf,
14 (both grizzly and wolf are federally protected threatened and
15 endangered species), mountain lion, bobcat, lynx, beaver, mink,
16 muskrat, sharptailed, ruffed, spruce and blue grouse, as well as
17 numerous waterfowl species. Grizzly bears in particular are drawn
18 to the area during the spring to feed on succulent plants that grow
19 in the moist environment of the swamp. As part of the Blackleaf
20 Wildlife Management Area, the swamp provides the needs for both
21 game and nongame wildlife and a resource that is available for the
22 recreational enjoyment by the public. (Olson Dir., DFWP Exh. 16,
23 pp. 2 and 3; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-455 through 3-
24 459).

1 (2) Threatened and Endangered Fish Species
2 and Species of Special Concern

3 276. Fish "Species of Special Concern" which occur in Missouri
4 basin streams above Fort Peck Dam include the following species:

5 Westslope cutthroat trout
6 Arctic grayling
7 Pallid sturgeon
8 Sturgeon chub
9 Paddlefish
10 Northern redbelly dace x finescale dace hybrid
11 Sickelfin chub
12 Blue Sucker

13 277. "Species of Special Concern" is a DFWP and American
14 Fisheries Society designation that reflects the limited numbers of
15 these fish present in the state, their limited distribution or the
16 limited amount of preferred habitat still available to them. These
17 fish have been eliminated or severely reduced in numbers over much
18 of their former range. (Spence Dir., DFWP Exh. 17, p. 11).
19

20 Westslope Cutthroat Trout

21 278. The westslope cutthroat trout, a "Species of Special
22 Concern", is native to Montana west of the Continental Divide and
23 to the Missouri River and its tributaries in the mountains east of
24 the Continental Divide. The Montana Natural Heritage Program
25 (MNHP) lists genetically pure westslope cutthroat as rare in
26 Montana. It is estimated that genetically pure westslope cutthroat
27 occupy only 1.1% of their historical range in Montana streams. The
28 decline of westslope cutthroat trout may be due to several factors,
including hybridization with non-native rainbow trout, competition
from introduced species, over-fishing and habitat alteration. (Bd.

1 Exh. 40, DEIS, p. 89; Hill Dir., DFWP Exh. 35, p. 4; DFWP 72155-
2 41A, Bd. Exh. 37-A.2, p. 2-10).

3 Arctic Grayling

4 279. The status of fluvial (permanently stream dwelling)
5 Arctic grayling, Thymallus arcticus, in Montana has been of
6 increasing concern in recent years. Stream populations of this
7 indigenous fish, which is an important component of the sport
8 fishery of Montana, have declined severely. (Kaya Dir., MTU/AFS
9 Exh. 10, p. 2).

10 280. The U.S. Fish and Wildlife Service (USFWS) classifies
11 fluvial Montana grayling as a category 1 species, the final
12 category before listing as threatened or endangered. On October 3,
13 1991, USFWS received a petition from private foundations to list
14 the stream-dwelling grayling as an endangered species throughout
15 its known historical range in the lower 48 states. (Kaya Dir.,
16 MTU/AFS Exh. 10, p. 4; Bd. Exh. 41, FEIS, p. 32).

17 281. The Arctic grayling was native to two areas in the lower
18 48 states: Michigan, where it is now extinct, and in the Missouri
19 River drainage above Great Falls, where it was once abundant. Once
20 widely distributed in the Missouri River and its tributaries
21 upstream from Great Falls, fluvial Montana grayling are now
22 restricted to the upper reaches of a single tributary, the Big Hole
23 River. This is the only confirmed fluvial grayling population
24 still remaining south of Canada and Alaska. Lake dwelling grayling
25 are abundant and secure in Montana in lakes in which they have been
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1 planted. (Kaya Dir., MTU/AFS Exh. 10, p. 2; Bd. Exh. 40, DEIS, p.
2 89; DFWP 72155-41A, Bd. Exh. 37-A.2, p. 2-10).

3 282. There is some evidence that suggests that a grayling
4 population that resides in Ennis Lake and moves back and forth
5 between the Madison River channels and Ennis Lake may be another
6 remnant of this same fluvial population (Fredenberg Cross, Tr. Day
7 12, pp. 116, 117 and 122).

8 283. Fluvial Montana grayling are reduced in distribution to
9 only about 8% or less of their historical range. The Michigan
10 grayling underwent a similar earlier decline and disappeared about
11 1936. Repeated attempts to establish or restore stream populations
12 in Michigan and Montana have not succeeded. (Kaya Dir., MTU/AFS
13 Exh. 10, p. 2).

14 284. The total estimated size of the current fluvial grayling
15 population in the 50 miles of the Big Hole River where they live is
16 approximately 1,500 grayling one year old or older. (Kaya Dir.,
17 MTU/AFS Exh. 10, p. 4).

18 285. Some Montana streams contain more than 1,500 age one or
19 older trout per single mile. (Kaya Dir., MTU/AFS Exh. 10, p. 4).

20 286. The cause of decline in stream-dwelling Arctic grayling
21 populations is not well understood but is believed to be identified
22 with low stream flows, changes in land use, over-harvest and
23 competition from introduced non-native species. (Kaya Dir.,
24 MTU/AFS Exh. 10, pp. 4 and 5; Bd. Exh. 40, DEIS, p. 89; DFWP 72155-
25 41A, Bd. Exh. 37-A.2, p. 2-10; Kaya Cross, Tr. Day 13, p. 78).

26 287. Degradation of fluvial grayling habitat in Montana
27 appears most frequently to have been related directly or indirectly
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1 to agricultural irrigation. The most important disturbances have
2 been reduction in streamflows through withdrawals of water for
3 irrigation, blockage of streams by dams for reservoirs and
4 diversions, and flooding of streams by reservoirs. (Kaya Dir.,
5 MTU/AFS Exh. 10, p. 5).

6 288. One of the main requirements for a healthier and more
7 productive grayling population in the Big Hole River drainage, ie.,
8 more fish, is more water. (Kaya Cross, Tr. Day 13, p. 83).

9 289. Among the factors most commonly cited as being
10 detrimental to Big Hole River grayling is the partial dewatering of
11 the river and its tributaries during summer by irrigation
12 diversions. In addition to this reduction in habitat for grayling
13 of all ages, other possible affects of dewatering include
14 interference with seasonal migrations, stranding of incubating eggs
15 or young fish, increased predation on young fish through their
16 being concentrated in remnant waters with adults and other fishes,
17 reduced food availability through habitat reduction for aquatic
18 invertebrates, and increased maximum daily temperatures. (Kaya
19 Dir., MTU/AFS Exh. 10, pp. 6 and 7).

20 290. Weak year classes of grayling are associated with lower
21 flows and strong year classes with flows normal or slightly above
22 average. During years of low flow, many adults move downstream
23 after spawning instead of remaining in upstream areas through the
24 summer, suggesting that low flows may be altering their migration
25 patterns by making them leave their summer feeding areas. (Kaya
26 Dir., MTU/AFS Exh. 10, p. 7).

1 291. Grayling populations in the Big Hole River are higher
2 during years when flows are higher and lower during low flow years.
3 (Kaya Re-cross, Tr. Day 13, pp. 100 through 102).

4 292. Irrigation diversions are also causing loss of grayling,
5 especially young fish. Fry and juveniles are found in the ditches
6 and may be carried into irrigated fields or left stranded in the
7 ditches when headgates are closed at the end of the irrigation
8 season. (Kaya Dir., MTU/AFS Exh. 10, p. 7).

9 293. Water withdrawals from the Big Hole River may be
10 contributing to elevated water temperatures during the summer
11 through a relationship between reduced flows and increased stream
12 temperatures. (Kaya Dir., MTU/AFS Exh. 10, pp. 7 and 8).

13 294. Restrictive fishing regulations since 1984 have not
14 improved the Big Hole River grayling population. (Kaya Cross, Tr.
15 Day 13, p. 85).

16 295. Since fishing harvest of grayling is now severely
17 restricted by present catch and release fishing regulations,
18 maintenance of adequate water flows may be the most critical
19 requirement for the continued existence of the severely depressed
20 population of fluvial grayling in the upper Big Hole River. (Kaya
21 Dir., MTU/AFS Exh. 10, p. 8).

22 Pallid Sturgeon

23 296. The pallid sturgeon, Scaphirhynchus albus, is one of the
24 two sturgeons in the genus Scaphirhynchus found in North America.
25 The other species is the more common shovelnose sturgeon (S.
26 platyrhynchus). Pallid sturgeon are one of the largest fish found in
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1 the Missouri River, with specimens approaching 6 feet and 85
2 pounds. (Dryer Dir., MTU/AFS Exh. 5, p. 1).

3 297. The original distribution of the pallid sturgeon included
4 the Mississippi River and large tributaries from Iowa to Louisiana,
5 the Missouri River from Great Falls to the mouth, and the
6 Yellowstone River below the mouth of the Tongue River. (Bd. Exh.
7 40, DEIS, p. 88).

8 298. Sturgeon are ancient fish which have survived and
9 remained relatively unchanged for over 200 million years. Man's
10 actions, however, have pushed the pallid sturgeon to the brink of
11 extinction within less than 50 years. Possible contributing
12 factors to the decline of the species includes channelization and
13 damming of rivers which has greatly reduced the migratory range of
14 the fish, operation of the dams which alter water quality and
15 flows, overfishing and environmental contaminants. (Dryer Dir.,
16 MTU/AFS Exh. 5, p. 3; Bd. Exh. 40, DEIS, p. 88).

17 299. In October 1990, the pallid sturgeon was listed as an
18 endangered species throughout its entire range. This designation
19 means that the species is in danger of extinction throughout all or
20 a significant portion of its range. (Dryer Dir., MTU/AFS Exh. 5,
21 pp. 2 and 3).

22 300. The pallid sturgeon's unique position in the Missouri
23 River aquatic ecosystem has already been severely unbalanced by
24 man, especially as one moves further and further downstream of
25 Montana. The Missouri River above Fort Peck Reservoir is the least
26 altered of the entire 2,000+ mile Missouri and Mississippi River
27 mainstem systems which encompass the range of the pallid sturgeon.
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1 Maintaining the natural Missouri River ecosystem in Montana is
2 important to recovery of the pallid sturgeon. (Dryer Dir., MTU/AFS
3 Exh. 5, p. 4).

4 301. During the 1960's, 500 observations of pallid sturgeon
5 were made over its entire range. By contrast, throughout the
6 1980's there were only 65 recorded observations of pallid sturgeon
7 over its entire range. Since 1980, only seven pallid sturgeon have
8 been recorded in the Missouri River above Fort Peck Reservoir in
9 Montana. (Dryer Dir., MTU/AFS Exh. 5, p. 3).

10 302. Pallid sturgeon are long-lived fish achieving ages of
11 more than 40 years. The time required to reach sexual maturity for
12 males is seven to nine years with a 2-3 year interval between
13 spawning years. Females reach sexual maturity in 15-20 years with
14 3-10 year intervals between spawning years. (Dryer Dir., MTU/AFS
15 Exh. 5, p. 2).

16 303. New depletions from proposed water reservation
17 applications could alter normal natural water temperatures and
18 turbidity and will alter the volume and velocity of flow in the
19 Missouri River. Alterations in the flow from a naturally-occurring
20 flow regime during spring and early summer months could affect any
21 existing spawning by remnant populations or it could affect the
22 potential for spawning of recovering or introduced populations
23 during a recovery program. Reduced flows which alter production
24 and survival of forage fish may also affect feeding habits of
25 pallid sturgeon because of the predominance of fish, primarily
26 cyprinids, in their diet. (Dryer Dir., MTU/AFS Exh. 5, p. 3).

Sturgeon Chub

304. The sturgeon chub is a member of the minnow family and is not a game fish. This fish lives in medium to large rivers that are turbid and warm, in areas of strong current with a sand or gravel bottom. It grows to be about four inches long. The sturgeon chub is a candidate for listing as an endangered and threatened species. (Bd. Exh. 40, DEIS, p. 89; Dryer Dir., MTU/AFS Exh. 5, p. 4).

Paddlefish

305. Paddlefish are Montana's largest game fish with female specimens often reaching five to six feet in length and weighing 75 to 125 pounds. Once abundant 150 million years ago, these primitive fish are presently found in only two river basins -- the Yangtze in China and the Mississippi/Missouri. (DFWP 72155-41A, Bd. Exh. 37-A.1, p. 1-40).

306. Stream channelization, dams, overharvesting and alteration of streamflows have reduced the range of paddlefish in the United States to only six isolated self-sustaining populations in the Mississippi/Missouri basins. The paddlefish population in Fort Peck Reservoir and the Missouri River above the reservoir is the oldest and most secure of all the North America populations. Growth rates of this population are also better than any of the other five populations. This is due largely to the unaltered free-flowing characteristics of this reach of the river which provides essential and irreplaceable spawning areas for paddlefish. (DFWP 72155-41A, Bd. Exh. 37-A.1, pp. 1-40 and 1-41).

1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the research and the objectives of the study. It also provides a brief overview of the methodology used in the study.

2. The second part of the report is a detailed description of the methodology used in the study. It discusses the data collection methods, the sample size, and the statistical methods used to analyze the data.

3. The third part of the report is a discussion of the results of the study. It presents the findings of the study and discusses their implications for the field of research.

4. The fourth part of the report is a conclusion and a list of references. The conclusion summarizes the main findings of the study and provides recommendations for future research. The references list the sources of information used in the study.

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1 307. The paddlefish is not yet listed as an endangered species
2 but it is a "Species of Special Concern" in Montana. (Berg Dir.,
3 DFWP Exh. 29, p. 3).

4 Northern Redbelly Dace x Finescale Dace Hybrid

5 308. This hybrid fish is produced when northern redbelly dace
6 are crossed with finescale dace. The hybrid is a parthenogenetic
7 species, which means that all of the individuals are female and
8 they produce exact clones of the mother through development of an
9 unfertilized egg. This peculiar minnow has been found in three
10 locations in the Missouri River basin above Fort Peck Dam and in
11 the Musselshell River. (Bd. Exh. 40, DEIS, p. 89; Fredenberg Dir.,
12 DFWP Exh. 27, p. 5).

13 Sickelfin Chub

14 309. The Montana Natural Heritage Program (MNHP) notes that
15 the sickelfin chub is critically imperiled in Montana and rare
16 throughout the rest of its range. The sickelfin chub is a member
17 of the minnow family and may grow to 3.5 inches in length. It has
18 been found along the lower portion of the Missouri River above Fort
19 Peck Reservoir. The sickelfin chub is a candidate for listing as
20 a federal endangered or threatened species. (Bd. Exh. 40, DEIS, p.
21 89; Dryer Dir., MTU/AFS Exh. 5, p. 4).

22 Blue Sucker

23 310. The blue sucker is rare in Montana. It has been found in
24 the Missouri River below Fort Benton, Marias River, the lower
25 Judith River and the lower portion of the Yellowstone River. The
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1 blue sucker is not a game fish in Montana. The state record weight
2 for a blue sucker is 11.5 pounds. The blue sucker is a candidate
3 for listing as a federal endangered or threatened species. (Bd.
4 Exh. 41, FEIS, p. 143; Dryer Dir., MTU/AFS Exh. 5, p. 4).

6 (3) Riparian Values

7 311. Riparian communities are the plants and animals
8 associated with stream courses and floodplains. From a wildlife
9 standpoint, the habitat diversity provided by riparian vegetation
10 is perhaps the greatest value provided by flowing water. (Casey
11 Dir., DFWP Exh. 28, p. 2).

12 312. Riparian soils are often geomorphically very young and
13 coarse textured and, therefore, transmit water readily and have a
14 low water retention capacity. Therefore, a dependable water supply
15 is essential to assure that riparian soils will serve as growth
16 media for woody vegetation. (Casey Dir., DFWP Exh. 28, p. 3).

17 313. Decreased flow can result in decreased riparian cover
18 because of induced soil moisture stress. Also, providing more
19 consistent flows in intermittent or ephemeral streams has been
20 shown to increase riparian vegetation. Light to moderate flooding
21 also favors establishment and regeneration of riparian communities
22 and some species such as willows and cottonwoods are dependent on
23 seasonal flooding for perpetuation of multi-aged stands. (Casey
24 Dir., DFWP Exh. 28, p. 3).

25 314. The importance of riparian habitats to wildlife has been
26 well documented in the scientific literature and their importance



1 in the arid west is well accepted by the scientific community.
2 (Casey Dir., DFWP Exh. 28, p. 3).

3 315. Because of their biological importance and because of
4 documented losses of riparian acreage through conversion to
5 agriculture and other land uses, maintenance of riparian habitats
6 is important wildlife across Montana and elsewhere in the west.
7 (Casey Dir., DFWP Exh. 28, p. 3).

8 316. Wooded riparian areas have been shown throughout the west
9 to support higher densities of breeding birds than any other
10 habitats. Breeding bird communities are frequently used as a
11 "barometer" of habitat richness and health because they are
12 relatively easy to measure and respond quickly and dramatically to
13 environmental changes. (Casey Dir., DFWP Exh. 28, p. 3).

14 317. The relationship between diversity of breeding birds and
15 riparian habitats has been documented. Cottonwood communities in
16 the Missouri River breaks supported more than 2-5 times as many
17 breeding pairs and twice the species of birds as did the upland
18 habitats investigated (upland habitats specifically were
19 greasewood-sagebrush, sagebrush-grassland, and pine-juniper).
20 (Casey Dir., DFWP Exh. 28, p. 4).

21 318. Many big game species which feed in a variety of
22 habitats, including agricultural lands, are dependent on wooded
23 riparian habitat for security and thermal cover during critical
24 times of the year. Many wildlife species are found almost
25 exclusively in riparian habitats. These include numerous songbird
26 species, waterfowl, ospreys and bald eagles, beavers, river otters,
27 and mink. (Casey Dir., DFWP Exh. 28, p. 4).
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1 319. Mature stands of cottonwood and younger stands of
2 willow/cottonwood on islands are two important nesting habitats for
3 Canada geese. (Casey Dir., DFWP Exh. 28, p. 4).

4 320. The importance of riparian habitat to specific wildlife
5 species has been quantified. (Casey Dir., DFWP Exh. 28, p. 4).

6 321. The biological abundance and diversity found within
7 riparian areas attracts increasing numbers of persons who recreate
8 along streams, including photographers, bird watchers, science
9 students, hunters, berry pickers and naturalists. (DFWP 72155-41A,
10 Bd. Exh. 37-A.1, p. 1-45).

11 322. Instream water reservations will help maintain the health
12 and vigor of riparian plant species through the provision of water
13 (either surface or subsurface) during critical periods in their
14 growth cycle. Although riparian habitat maintenance is viewed as
15 an important, but secondary, benefit of the water reservations
16 requested by DFWP, instream flows in all cases should help maintain
17 existing riparian vegetation which has corresponding benefits to
18 the wildlife community. (Casey Dir., DFWP Exh. 28, pp. 2 and 5).

19 323. Water reservation requests from other entities which
20 would result in seasonal dewatering or impoundment could, in many
21 cases, result in loss of riparian habitats over time, either
22 through prevention of seasonal flooding essential to regeneration
23 or through induced moisture stress during the growing season.
24 (Casey Dir., DFWP Exh. 28, p. 5).

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177. Number of days in 1900

178. Number of days in 1901

179. Number of days in 1902

180. Number of days in 1903

181. Number of days in 1904

182. Number of days in 1905

183. Number of days in 1906

184. Number of days in 1907

185. Number of days in 1908

186. Number of days in 1909

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1 (4) Wildlife Values

2 324. Although the number of species varies from stream to
3 stream, all of the streams where DFWP has requested flows for
4 fishery purposes also harbor a wide diversity of wildlife species.
5 (DFWP 72155-41A, Bd. Exh. 37-A.2, pp. 2-8 through 2-615; Bd. Exh.
6 37-A.3, pp. 3-1 through 3-459).

7 325. In addition to those numerous wildlife species occurring
8 along the stream corridors, a number of threatened and endangered
9 wildlife species occur in some stream reaches:

10 Bald Eagle

11 326. The bald eagle occurs year-round in the upper Missouri
12 basin and is federally classified as an endangered species. From
13 30-50 eagles winter on area reservoirs and rivers. Winter
14 densities are typically highest in the area of Ennis Reservoir on
15 the Madison River and along the headwaters of the Missouri River
16 near Three Forks, where 12-15 eagles may be present at each
17 location. Bald eagles commonly pass through the upper basin during
18 fall and spring migrations. The Missouri basin between Canyon
19 Ferry Dam and Fort Peck Reservoir also provides important habitat
20 for bald eagles. Three active bald eagle nesting sites have been
21 identified along the Missouri River corridor between Hauser Lake
22 and Great Falls. (DFWP 72155-41A, Bd. Exh. 37-A.2, p. 2-9; DFWP
23 72155-41A, Bd. Exh. 37-A.3, p. 3-5).

24 Peregrine Falcon

25 327. The peregrine falcon is an endangered species and occurs
26 as a casual migrant in the upper Missouri basin in spring and fall.
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20/10/1944

Dear Mr. [Name]

I am very sorry to hear

that you are ill

and hope you will

be able to return

to work soon

Yours faithfully

[Signature]

[Name]

[Address]

[City]

[Country]

[Postcode]

[Phone Number]

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1 Following recent efforts to reintroduce peregrines to their former
2 breeding range in the upper basin, three breeding pairs are
3 presently established and more are anticipated in the near future.
4 The Missouri River basin between Canyon Ferry Dam and Fort Peck
5 Reservoir also provides important habitat for peregrine falcons.
6 Two active peregrine nesting sites have been identified along the
7 river corridor between Hauser Lake and Great Falls and attempts are
8 underway to reintroduce peregrine falcons along this stretch of the
9 river. (DFWP 72155-41A, Bd. Exh. 37-A.2, p. 2-9; DFWP 72155-41A,
10 Bd. Exh. 37-A.3, p. 3-5).

11 Whooping Crane

12 328. The whooping crane is a federally designated endangered
13 species and occurs primarily in the Redrock Lakes National Wildlife
14 Refuge in Montana. (DFWP 72155-41A, Bd. Exh. 37-A.2, p. 2-9).
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16 Grizzly Bear

17 329. Grizzly bears designated as threatened by the federal
18 government use the mountain wildlands of the Madison, Gallatin and
19 Ruby river drainages year long for winter denning, feeding and day-
20 bedding and as a travel corridor. In the lower Missouri basin,
21 grizzly bears also inhabit the headwater streams and foothills
22 along the east slope of the Continental Divide, including streams
23 in the Marias and Teton river sub-basins. The grizzly bear
24 utilizes many of these areas during the spring, summer and fall.
25 (DFWP 72155-41A, Bd. Exh. 37-A.2, pp. 2-9 and 2-10; Hill Dir., DFWP
26 Exh. 35, pp. 4 through 9).

1 C. FINDINGS ON THE AMOUNT OF THE INSTREAM RESERVATIONS OF WATER
2 APPLIED FOR BY DFWP [SECTION 85-2-316(4)(a)(iii), MCA]

3 (1) Instream Flow Methods

4 330. The instream flows requested by DFWP are intended to
5 maintain fishery values. Several methods were used to determine
6 the requested amounts of water. (DFWP 72155-41A, Bd. Exh. 37-A.1,
7 p. 1-11).

8 331. Positive relationships between fish abundance and the
9 magnitude of a stream's annual low flows are well documented in the
10 scientific literature. Higher flows generally lead to a greater
11 abundance of fish. (DFWP Exh. 23, p. 7; White Dir., MTU/AFS Exh.
12 9, p.2).

13 332. The best and most accurate means for deriving minimum
14 flow requests to protect fishery values is to directly observe the
15 response of the fish populations to flow variations over a period
16 of many years. Because of the intensive data requirements and
17 long-term commitment, this approach is impractical for a water
18 reservation process, requiring the use of an array of less time-
19 consuming and more practical alternatives. (Nelson Dir., DFWP Exh.
20 22, p. 4; Thomas Dir., MTU/AFS Exh. 8, p. 3).

21 333. These alternative, or shortcut, instream techniques are
22 designed to determine how much water a stream needs to protect
23 aquatic life, and are divided into three general groups of methods:
24 1) non-field, 2) incremental, and 3) habitat retention. (Nelson
25 Dir., DFWP Exh. 22, p. 4; Thomas Dir., MTU/AFS Exh. 8, p. 3).

26 334. Because non-field methods are usually performed in the
27 office and are commonly based on a flow quantity derived from the
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1 historic flow record, they are normally confined to deriving
2 preliminary recommendations. This limits their suitability for use
3 in Montana's water reservation process. (Nelson Dir., DFWP Exh.
4 22, p. 4; Nelson Cross, Tr. Day 8, p. 128).

5 335. Incremental methods attempt to predict the actual amount
6 of suitable fish habitat that is present as flow changes
7 incrementally. They provide a means for measuring trade-offs as
8 opposed to providing minimum flow recommendations. This method is
9 costly, complex and time-consuming and has limited application to
10 the water reservation process. (Nelson Dir., DFWP Exh. 22, p. 5
11 and Nelson Reb., DFWP Exh. 44, pp. 2 through 4 and Attachment B, p.
12 180; Nelson Cross, Tr. Day 8, pp. 135, 136, 138, 139, 140, 141 and
13 232; Thomas Dir., MTU/AFS Exh. 8, p. 4).

14 336. Habitat retention methods examine various components of
15 a stream's hydraulic characteristics at various flows for the
16 purpose of developing generalized habitat-flow relationships. The
17 outcome is a minimum flow recommendation that is intended to fully
18 protect some aspect of the stream resource. These methods, also
19 termed standard-setting methods, are most appropriate for the water
20 reservation process. (Nelson Dir., DFWP Exh. 22, p. 5; Nelson
21 Reb., DFWP Exh. 44, p. 3 and Attachment B, p. 180; Thomas Dir.,
22 MTU/AFS Exh. 8, p. 4).

23 337. No existing instream flow method can quantitatively
24 predict the response of a stream's fish community to incremental
25 changes in flow. These relationships are solely the product of
26 stream-specific, long-term, biological studies. (Nelson Dir., DFWP
27 Exh. 22, pp. 12 and 13).
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1 historic tide record, 1871 to 1900
2 preliminary report on the
3 in 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900
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1 338. Habitat retention methods examined by DFWP for use in the
2 reservation process included the Wetted Perimeter Inflection Point
3 Method (Wetted Perimeter for short), Habitat Quality Index, and R-2
4 Cross Method (also referred to as the Sag Tape Method and, in
5 Wyoming, as the Habitat Retention Method). (Nelson Reb., DFWP Exh.
6 44, pp. 4 and 5).

7 339. The Habitat Quality Index and R-2 Cross methods, when
8 tested and investigated by DFWP, were found unsuited for use in
9 Montana's water reservation process. (Nelson Reb., DFWP Exh. 44,
10 pp. 4 and 5; Nelson Cross, Tr. Day 9, pp. 102 and 103).

11 340. The Wetted Perimeter Method was chosen to derive minimum
12 instream flow requests for the majority of streams in DFWP's
13 application. (DFWP 72155-41A, Bd. Exh. 37-A.1, p. 1-18).

14 341. The Wetted Perimeter Method originated in Washington and
15 Idaho in the early-1970's. (Nelson Dir., DFWP Exh. 22, pp. 5 and
16 6 and DFWP Exh. 24, p. 4).

17 342. Wetted perimeter is a well recognized and commonly used
18 minimum flow method, particularly in the Pacific Northwest and
19 Rocky Mountain region of North America. (Nelson Reb., DFWP Exh.
20 44, pp. 1 and 2 and Attachment A, pp. 23 through 27; White Dir.
21 MTU/AFS Exh. 9, p. 3; Thomas Dir., MTU/AFS Exh. 8, p. 3).

22 343. Biological studies by DFWP and Montana State University
23 support the validity of the minimum recommendations generated by
24 the Wetted Perimeter Method. (Nelson Cross, Tr. Day 9, pp. 96
25 through 98; White Dir., MTU/AFS Exh. 9, p. 2).

26 344. Wetted perimeter is the distance along the bottom and
27 sides of a channel cross-section that is in contact with water when
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1 the stream is viewed in cross-section. (Nelson Dir., DFWP Exh. 22,
2 p. 6 and Attachment B).

3 345. The relationship between wetted perimeter and flow for
4 stream riffles generally, but not always, shows two inflection
5 points where the rate of increase of wetted perimeter changes.
6 Below the lower inflection point, flow is spreading out
7 horizontally across the stream bottom, causing the wetted perimeter
8 to increase rapidly for very small increases in flow. A point is
9 eventually reached (at the lower inflection point) where the water
10 starts to move up the sides of the active channel and the rate of
11 increase of wetted perimeter begins to decline. At the upper
12 inflection point, the stream is approaching its maximum width and
13 begins to move up the banks as flow increases. Large increases in
14 flow beyond the upper inflection point cause only small increases
15 in wetted perimeter. (Nelson Dir., DFWP Exh. 22, p. 7 and
16 Attachments C and D).

17 346. The relationship between wetted perimeter and flow is
18 derived for stream riffles. A riffle is a section of stream in
19 which the water flow is rapid and shallower than the sections above
20 and below. It has a substratum of gravel and rubble and is a very
21 distinct habitat type that can be readily distinguished visually.
22 Streams usually consist of a succession of pools and riffles.
23 (Nelson Dir., DFWP Exh. 22, p. 6; Nelson Redirect, Tr. Day 9, p.
24 100).

25 347. Riffles are the primary stream habitat where aquatic
26 invertebrates, the main food of Montana's stream-dwelling game
27 fish, are produced. (Nelson Dir., DFWP Exh. 22, pp. 6 and 7).
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1 348. Food supply is a major factor influencing the abundance
2 of game fish in Montana's streams. (Nelson Dir., DFWP Exh. 22, p.
3 11 and DFWP Exh. 23, pp. 10 through 12).

4 349. The underlying assumption of the wetted perimeter
5 methodology is that food becomes limiting as flow associated
6 reductions in wetted perimeter occur. This is a very reasonable
7 assumption since many stream fish species rely on aquatic and
8 invertebrates as their primary food source and the primary food
9 production area is in riffles. (White Dir., MTU/AFS Exh. 9, p. 3).

10 350. As riffle areas are dewatered, food production is
11 assumed to be reduced, resulting in a decrease in the carrying
12 capacity of the stream. (White Dir., MTU/AFS Exh. 9, p. 3).

13 351. Aquatic invertebrates - gill-breathing organisms that
14 inhabit the small spaces within the riffle bottom - require a cover
15 of flowing water to supply life-sustaining oxygen. (Nelson Dir.,
16 DFWP Exh. 22, p. 7).

17 352. The Wetted Perimeter Method provides the minimum
18 streamflow that will cover most of a stream's riffle area with
19 water. This is the upper inflection point flow. (Nelson Dir.,
20 DFWP Exh. 22, pp. 6 and 7).

21 353. The upper inflection point flow is derived from the plot
22 of the relationship between wetted perimeter and flow for the
23 stream riffles of interest. These plots are generated using DFWP's
24 wetted perimeter computer program, which is calibrated using
25 surveyed channel measurements that are taken at different flows for
26 each stream of interest. (Nelson Dir., DFWP Exh. 22, pp. 9 and
27 10).
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1 354. A number of checks were used by DFWP in developing and
2 analyzing wetted perimeter information so that the results would be
3 as reliable and accurate as possible. (Nelson Cross, Tr. Day 9,
4 pp. 104, 105, 106, 107, 124 and 125).

5 355. Wetted perimeter field data, used to calibrate the wetted
6 perimeter computer program, were collected by a team of DFWP
7 personnel, usually consisting of a team leader - typically a
8 biologist - and two or more field workers. Approximately 12 teams
9 collected the wetted perimeter data presented in DFWP's
10 application. (Nelson Dir., DFWP Exh. 22, p. 10).

11 356. DFWP personnel were trained in the use of the Wetted
12 Perimeter Method at workshops conducted by DFWP, often in
13 conjunction with the USGS. Training included: Theory of the
14 Wetted Perimeter Method, surveying and field techniques, selection
15 of study sites, data coding, flow measuring procedures, and field
16 exercises. (Nelson Dir, DFWP Exh. 22, pp. 2 and 10; Nelson Cross,
17 Tr. Day 12, p. 230; Frazer Cross, Tr. Day 9, pp. 156, 157, 168).

18 357. Application of the Wetted Perimeter Method by DFWP's
19 field personnel was governed by procedures and standards discussed
20 in DFWP's 1980 publication titled "Guidelines for Using the Wetted
21 Perimeter (WETP) Computer Program of the Montana Department of
22 Fish, Wildlife and Parks", which was updated in 1985 and 1989.
23 (DFWP Exh. 24, pp. 1 through 28 and A-1 through C-19; and Nelson
24 Dir., DFWP Exh. 22, p. 2).

25 358. In 1985, at the suggestion of the USFWS Instream Flow
26 Service Group, the stage at zero flow was incorporated into DFWP's
27 wetted perimeter computer program. This addition improved the
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1 accuracy of the wetted perimeter predictions for flows that are
2 less than the lowest calibration flows measured in the field. The
3 wetted perimeter information presented in DFWP's application
4 reflects this 1985 modification. (DFWP Exh. 24, pp. 8 and 9;
5 Nelson Cross, Tr. Day 9, p. 112; Nelson Cross, Tr. Day 8, pp. 119
6 and 120; Nelson Cross, Tr. Day 5, p. 82; Nelson Cross, Tr. Day 5,
7 pp. 92 and 93).

8 359. When using the Wetted Perimeter Method, there are no
9 benefits from incorporating depth and velocity parameters. (Nelson
10 Cross, Tr. Day 9, p. 99).

11 360. There are no instream flow methods that establish
12 confidence levels around the flow predictions. (Nelson Cross, Tr.
13 Day 9, pp. 103 and 104).

14 361. At the upper inflection point flow, a stream's food-
15 producing potential is near maximum because most of the riffle
16 habitat is covered with water. Maintaining near maximum food-
17 producing potential will, in turn, benefit game fish populations.
18 (Nelson Dir., DFWP Exh. 22, p. 12 and DFWP Exh. 23, pp. 11 and 12;
19 White Dir., MTU/AFS Exh. 9, p. 3).

20 362. Riffles are also used by many game fish species for
21 spawning and for the rearing of their young. Flow requests that
22 protect the food-producing capacity of riffles will also help to
23 protect the fishes' spawning and rearing areas. (DFWP Exh. 23, p.
24 53).

25 363. Riffles are the area of a stream that is most sensitive
26 to flow reductions. Therefore, a flow request that wets most of
27 the riffle area will, at the same time, help to protect a stream's
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1 pools and runs - areas where adult fish normally reside. (DFWP
2 Exh. 23, p. 53).

3 364. Flows at the upper inflection point are needed to provide
4 minimum instream flow protection for those streams having the more
5 significant fishery values. These include streams that have
6 national, regional or local importance as sport fisheries; streams
7 that support significant numbers of game fish for their stream type
8 and size; streams that support "Species of Special Concern"
9 (westslope cutthroat trout and arctic grayling, for example);
10 streams that provide crucial reproductive habitats for reservoir,
11 lake or mainstem river populations of game fish; and streams that
12 have the capacity to provide outstanding fisheries but are
13 prevented from reaching their potential due to stream dewatering
14 and other forms of habitat degradation. (Nelson Dir., DFWP Exh.
15 22, pp. 8 and 9 and Hill Reb., DFWP Exh. 47, p. 1).

16 365. Upper inflection point flows are warranted for the
17 preponderance of streams in DFWP's application because DFWP's
18 application generally addressed only those streams in the Missouri
19 River Basin above Fort Peck Dam having the more significant fishery
20 values. (Spence Dir., DFWP Exh. 17, p. 13).

21 366. The upper inflection point flow requests, when averaged
22 for all streams, equal about 40% of the average annual flow. (Bd.
23 Exh. 41, FEIS, p. 85; DFWP 72155-41A, Bd. Exh. 37-A.1, p. 1-20;
24 Nelson Cross, Tr. Day 12, p. 204).

25 367. The fishery biologists who derived the instream flow
26 requests using the Wetted Perimeter Method had the option of
27 requesting a flow lower than the upper inflection point if, based
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on their professional evaluation of the stream resource, a lower flow request was sufficient to provide minimum instream flow protection. The lowest possible flow request, which is the lower inflection point flow, was limited to those streams having the less significant fishery resource values. (Nelson Dir., DFWP Exh. 22, pp. 7 through 9).

368. Instream flow requests at the lower inflection point or between the lower and upper inflection points were made for the following 24 stream reaches. (DFWP 72155-41A, Bd. Exh. 37-A.2, pp. 2-1 through 2-620 and Bd. Exh. 37-A.3, pp. 3-i through 3-464):

Red Rock-Beaverhead R. Sub-basin
Blacktail Deer Creek

Ruby River Sub-basin
Ruby River (Reach #1)
Middle Fork Ruby River
East Fork Ruby River
West Fork Ruby River
Cottonwood Creek

Big Hole River Sub-basin
Pattengail Creek
Birch Creek

Jefferson River Sub-basin
Boulder River (Reach #3)

Gallatin River Sub-basin
Porcupine Creek
Middle Fork of the West
Fork Gallatin River
South Fork of the West
Fork Gallatin River
Big Bear Creek
Hyalite (Middle) Creek - Reach #2

Little Prickly Pear Cr. Sub-basin
Virginia Creek

Dearborn River Sub-basin
Flat Creek

Smith River Sub-basin
Smith River - Reach #3

Sun River Sub-basin
Sun River - Reach #1
Sun River - Reach #2

Belt Creek Sub-basin
Belt Creek - Reach #2

Judith River Sub-basin
Judith River - Reach #2
Cottonwood Creek

Musselshell River Sub-basin
Musselshell River - Reach #1
Musselshell River - Reach #2



1 369. The low inflection point flow requests, when averaged,
2 equal about 20% of the average annual flow. (Bd. Exh. 41, FEIS, p.
3 85).

4 370. The instream flows requested by DFWP are intended to
5 maintain fishery values. Flows less than what have been requested
6 will not serve that purpose. (Nelson Cross, Tr. Day 13, p. 18).

7 371. Flow requests based on the Wetted Perimeter Method apply
8 to the non-winter period from approximately April through October.
9 This is the period when fish grow and feed intensively and are
10 being recruited into the population. Food supply appears to be a
11 major limiting factor during this period. Fish food diversity and
12 abundance are related to trout standing crops. Adequate summer
13 flows are critical to preserving aquatic life. (Nelson Dir., DFWP
14 Exh. 22, p. 15; Nelson Cross, Tr. Day 8, pp. 121, 122; Thomas Dir.,
15 MTU/AFS Exh. 8, p. 7).

16 372. The limiting factor that regulates fish populations
17 during the winter is fish habitat. The policy of DFWP when
18 deriving flow requests for winter (approximately November through
19 March) is to fully protect winter flows. This is based on the fact
20 that winter is the most critical period influencing game fish
21 densities in undepleted streams. Also, in winter, stream flows are
22 typically at their annual lows in Montana's undepleted streams.
23 (Nelson Dir., DFWP Exh. 22, pp. 15 and 16; Nelson Reb., DFWP Exh.
24 45, p. 7; Nelson Cross, Tr. Day 12, p. 195; Nelson Cross, Tr. Day
25 8, pp. 121, 122).

26 373. Upper inflection point flow requests derived from the
27 Wetted Perimeter Method typically exceed base winter flows. Winter
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1 flows would, therefore, be fully protected if upper inflection
2 point requests were extended through the winter. In DFWP's
3 application, requests based on the Wetted Perimeter Method were,
4 for the majority of streams, extended through winter (DFWP Exh. 23,
5 pp. 59 and 60).

6 374. A common criticism of the Wetted Perimeter Method is that
7 inflection points are sometimes poorly defined and difficult to
8 identify. In Montana, the Wetted Perimeter Method has been
9 primarily applied to fairly high gradient mountain streams that
10 contain well-defined riffles having rectangular cross-sectional
11 profiles. Due to this riffle configuration, inflection points,
12 particularly upper ones, are readily discernible for the majority
13 of streams. However, exceptions do occur and require some level of
14 professional judgment in identifying inflection points. (Nelson
15 Dir., DFWP Exh. 22, p. 13).

16 375. Professional judgment, which plays a role in formulating
17 flow recommendations with all instream flow methods, including the
18 Wetted Perimeter Method, is an accepted and often desired component
19 of instream flow methods. (Nelson Dir., DFWP Exh. 22, pp. 13 and
20 14; Nelson Reb., DFWP Exh. 44, Attachment A, p. 27; Nelson Cross,
21 Tr. Day 9, p. 120; Thomas Dir., MTU/AFS Exh. 8, p. 5).

22 376. High inflection point determinations were made by
23 biologists who were instructed to use all the resources they had
24 available in coming to that determination. These resources
25 included their own visual observations of the stream, photographs
26 they took of the stream and the knowledge they gained by being on
27 the stream -- all used in conjunction with the graphical
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1 relationship of wetted perimeter and flow that was generated for
2 each stream. (Nelson Cross, Tr. Day 12, p. 230).

3 377. Biological assumptions are a prominent component of all
4 instream flow methods, including the Wetted Perimeter Method.
5 (Nelson Dir., DFWP Exh. 22, pp. 10 and 11; White Dir., MTU/AFS Exh.
6 9, p. 3).

7 378. The Wetted Perimeter Method is intended to be applied
8 towards the lower end of the stream where the reservation is
9 intended to be monitored. Instream reservations would not be
10 monitored throughout the length of the stream. (Nelson Cross, Tr.
11 Day 8, p. 158).

12 379. The Wetted Perimeter Method is not applicable to braided
13 stream segments because they are difficult to model hydraulically,
14 making most computer models, including WETP, unworkable. Waters
15 having little or no riffle development, such as cascading mountain
16 streams that plunge from pool to pool and some low gradient,
17 prairie streams, are another exception, as are spring creeks. The
18 seasonably stable flows that characterize spring creeks prevent the
19 collection of field data at a high, medium and low flow, which is
20 information required to calibrate the wetted perimeter computer
21 program. Other methods must be applied to these waters. (Nelson
22 Dir., DFWP Exh. 22, p. 15; Thomas Dir., MTU/AFS Exh. 8, pp. 4-5).

23 380. For 61 stream reaches in its application, DFWP relied
24 upon four alternative approaches for deriving flow requests.
25 (Nelson Dir., DFWP Exh. 22, p. 19).

26 381. The first of the four alternate approaches, termed the
27 Fixed Percentage Technique, was applied to 27 highly valued stream
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reaches, where time constraints, access limitations and other considerations prevented the use of the Wetted Perimeter Method. (Nelson Dir., DFWP Exh. 22, p. 19; DFWP 72155-41A, Bd. Exh. 37-A.1, p. 1 through 19). These are:

Beaverhead-Red Rock Sub-basin

Browns Canyon Creek
Red Rock River (Reach #1)
Reservoir Creek
West Fork Dyce Creek

Big Hole Sub-basin

Big Lake Creek
Delano Creek
Jacobson Creek
Rock Creek
Wyman Creek

Gallatin Sub-basin

Hell Roaring Creek

Jefferson Sub-basin

Halfway Creek

Madison Sub-basin

Cougar Creek
Duck Creek
Elk River
Moore Creek
Red Canyon Creek
Trapper Creek
Watkins Creek

Ruby Sub-basin

Coal Creek

Upper Missouri Sub-basin

Deep Creek

Smith Sub-basin

North Fork Deep Creek

Musselshell Sub-basin

Collar Gulch Creek

Marias Sub-basin

Badger Creek
Birch Creek
Cut Bank Creek
North Fork Deep Creek
South Fork Deep Creek

382. For the Fixed Percentage Technique, the high inflection point flows that were derived for those streams in which the Wetted Perimeter Method was applied, were expressed as percentages of the average annual flow for each stream. These percentages were then arrayed by sub-basin and the individual percentages in each sub-basin were averaged to derive a sub-basin mean. The mean percentage for each sub-basin was then used to calculate flow requests for the tributary streams in that sub-basin (the above 27)

1 for which flow requests from the Wetted Perimeter Method were not
2 available. High inflection point flows, when averaged by sub-
3 basin, ranged from 27-48% of the average annual flow. (Nelson
4 Dir., DFWP Exh. 22, p. 19).

5 383. The second of the four alternative instream flow
6 approaches, termed the Base Flow Approach, was applied to 17 high
7 quality spring-fed streams where seasonally stable flows prevented
8 the required collection of wetted perimeter calibration data at a
9 series of different flows. (Nelson Dir., DFWP Exh. 22, p. 21;
10 Thomas Dir., MTU/AFS Exh. 8, p. 5).

11 384. Spring-fed streams have the potential to grow and sustain
12 trout at levels that far exceed the biological capability of most
13 other streams, making them a highly valued fishery and recreational
14 resource. (Nelson Dir., DFWP Exh. 22, p. 21; Thomas Dir., MTU/AFS
15 Exh. 8, p. 5).

16 385. The base flow - the lowest mean monthly flow for the
17 year, which typically occurs in winter - is sufficient to protect
18 fishery values on spring-fed streams. Base flow is the typical low
19 flow event on undepleted streams. (Nelson Dir., DFWP Exh. 22, p.
20 21).

21 386. DFWP requested the base flow for the following 17 waters
22 (DFWP 72155-41A, Bd. Exh. 37-A.1, pp. 1 through 24):

23 Beaverhead-Red Rock Sub-basin
24 Poindexter Slough

Belt Creek Sub-basin
Big Otter Creek

25 Gallatin Sub-basin
26 Ben Hart Spring Creek
Thompson Spring Creek

Lake Helena-Hauser Reservoir
McGuire Creek
Spokane Creek
Silver Creek

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Jefferson Sub-basin

Willow Spring Creek

Sun Sub-basin

North Fork Willow Creek

Madison Sub-basin

Antelope Creek

Black Sand Spring Creek

Blaine Spring Creek

O'Dell Spring Creek

S.F. of the Madison River

Teton Sub-basin

McDonald Creek

Spring Creek

Ruby Sub-basin

Warm Springs Creek

387. Stickney and Wegner creeks - tributaries to the Missouri River - had flow requests determined by a method similar to the Base Flow Approach. These streams, which are intermittent in their lower reaches, are important in the spring when runoff provides flows which allow rainbow trout to enter from the Missouri River to spawn and for young fish to migrate back to the Missouri River when flows are available. Requested flows were the mean monthly flows for the four months of the year when spawning/rearing occurs. (Nelson Dir., DFWP Exh. 22, pp. 21 and 22; DFWP 72155-41A, Bd. Exh. 37-A.3, pp. 3-112 to 3-114).

388. The third of the four alternative instream flow approaches is termed Water Quality and Flow Management Maintenance. For Beaver Creek, Cabin Creek and the West Fork Madison River in the upper Madison River Sub-basin, all remaining unappropriated water was requested instream to help insure that adequate fishery maintenance flows are provided to the upper Madison River when Hebgen Reservoir is filled each year and flow releases into the river are reduced. (DFWP 72155-41A, Bd. Exh. 37-A.2, pp. 2-429, 2-433 and 2-442).

1 389. For Reach #1 of the East Gallatin River, Bridger Creek,
2 Rocky Creek, and Sourdough Creek - headwaters in the East Gallatin
3 River Sub-basin - all remaining unappropriated water was requested
4 instream to provide the dilution flows that are needed to protect
5 the water quality component of fish habitat in the East Gallatin
6 River, a stream with a history of pollution problems. (DFWP 72155-
7 41A, Bd. Exh. 37-A.2, pp. 2-536 through 2-546 and 2-569 through 2-
8 575).

9 390. The fourth alternative method relies on Biological-Flow
10 Relationships developed from long-term field studies. Streams in
11 which flow requests are based, in whole or in part, on biological
12 studies are: Gallatin River - Reach #2; Madison River - Reach #4;
13 Narrows Creek; and Missouri River mainstem Reaches #2 through #6.
14 (DFWP 72155-41A, Bd. Exh. 37-A.2, pp. 2-31 through 2-32, 2-402
15 through 2-405, and 2-484 through 2-486; and Bd. Exh. 37-A.3, pp. 3-
16 6 through 3-38).

17 391. The instream flow requests in DFWP's application reflect,
18 in general, the minimum flow needs of the fisheries in the lower
19 (downstream) portions of the designated stream reaches. (Nelson
20 Cross, Tr. Day 12, p. 194; Nelson Cross, Tr. Day 8, p. 174).

21 392. Maintaining the status quo pertains to the fish
22 populations that are presently in a stream. By maintaining the
23 existing flows, low flows will occur less frequently, i.e., the
24 status quo of current low flows is maintained, which in turn
25 maintains the status quo of existing fish populations. (Nelson
26 Cross, Tr. Day 13, p. 8).

1. The first part of the report is a general introduction to the subject.

2. The second part is a detailed description of the methods used in the study.

3. The third part is a discussion of the results of the study.

4. The fourth part is a conclusion and a list of references.

5. The fifth part is a list of figures and tables.

6. The sixth part is a list of appendices.

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1 393. The purpose of a high inflection point flow
2 recommendation is to provide a flow that would wet much of the
3 riffle wetted perimeter. Flows which occur up to that point will
4 be beneficial to the fish because of their impact on riffle food
5 production. Flows above the upper inflection point will still be
6 beneficial but will have less benefit than flows up to the high
7 inflection point. Flows above the high inflection point are
8 relinquished when making such a recommendation. (Nelson Cross, Tr.
9 Day 13, pp. 7 and 8).

10 394. The Wetted Perimeter Method does not incorporate existing
11 water availability into the method. The method generates a minimum
12 flow recommendation and that recommendation is not adjusted to
13 reflect what the historic low flow event is. The instream flow
14 recommendation is not downgraded to equal the historic low flow
15 event. (Nelson Cross, Tr. Day 13, pp. 9 and 10).

16 395. The U.S. Fish and Wildlife Service's Instream Flow Group
17 has been involved for many years in the application and development
18 of instream flow methods. Procedures such as the WETP method used
19 by DFWP are appropriate for protecting the existing instream
20 resource for purposes of state water plans and state water
21 allocations such as permits or reservations, and for identifying
22 target flows for use during project feasibility studies. (Bd. Exh.
23 41, FEIS, p. C-10; Trihey and Stalnaker (1985), Bd. Exh. 41, FEIS,
24 p. R-9).

25 396. More advanced incremental methods such as the instream
26 flow group's Instream Flow Incremental Method (IFIM), are most
27 appropriate for time series analysis to identify limiting flow
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1 conditions, fine tuning a resource maintenance objective (maximum
2 utilization of available water), avoiding or minimizing flow-
3 related impacts for specific projects and comparing mitigation
4 alternatives. (Bd. Exh. 41, FEIS, p. C-10).

5 397. DNRC believes that, when properly implemented, the WETP
6 method accurately portrays the amount of riffle bottom remaining
7 wet as flows change. (Bd. Exh. 41, FEIS, p. C-10).

8 398. The instream flow methods used by DFWP to determine the
9 amount of water needed for fishery resources are accurate and
10 suitable and provide reasonable estimates of the amount of water
11 needed to maintain instream benefits.

12
13 (2) Water Availability

14 399. For a water reservation application to be complete, an
15 analysis must be made to estimate the physical availability of
16 flows or aquifer yields. For gauged streams, the amount of water
17 physically available on a monthly basis must be demonstrated using
18 available water resources data. Statistical information on stream
19 flows must include monthly means and 20, 50 and 80th percentile
20 exceedence frequency flows. For drainages in which gauging records
21 are not available, monthly flows must be calculated using a state-
22 of-the-art flow estimation technique proved by the department
23 (DNRC). (ARM 36.16.105B(2), (2a) and (2b)).

24 400. DFWP contracted with the Helena office of the U.S.
25 Geological Survey (USGS) to obtain the physical availability of
26 flows on the streams in its application. (DFWP 72155-41A, Bd. Exh.
27 37-A.1, p. 1-29).
28

1 401. The USGS completed Water-Resources Investigations Report
2 89-4082 entitled "Estimates of Monthly Streamflow Characteristics
3 at Selected Sites in the Upper Missouri River Basin, Montana, Base
4 Period Water Years 1937-86", containing streamflow estimates at 312
5 sites. Streamflow characteristics that were estimated were the
6 monthly mean discharges that are exceeded 90, 80, 50 and 20 percent
7 of the years of extended record (1937-86) and the mean monthly
8 discharge for each month. (DFWP Exh. 12, p. 1; Parrett Dir., DFWP
9 Exh. 11, p. 2).

10 402. Of the 312 sites presented in Report 89-4082, 100 sites
11 had gauged records, 139 had miscellaneous measurement records, and
12 73 had no streamflow records. (DFWP Exh. 12, p. 3).

13 403. Of the 73 sites where no flow measurements were made,
14 flows were estimated using basin characteristics for 52 sites,
15 concurrent measurements for 14 sites and a drainage area ratio
16 adjustment for 7 sites. No sites were estimated using only the
17 channel width method. (DFWP Exh. 12, Table 1, pp. 21-27).

18 404. Flow estimating sites for the water availability study
19 were selected by the USGS so that they would be reflective of the
20 flows available to the entire reach even though the estimated flow
21 at that site may not be the flow at other specific points on the
22 stream. (Parrett Cross, Tr. Day 7, pp. 138 and 143).

23 405. The 1937-86 base period of record was selected and the
24 general study approach determined following consultation with the
25 Department of Natural Resources and Conservation and the U.S.
26 Geological Survey. (Parrett Cross, Tr. Day 7, pp. 102, 150 and
27 151).
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1 406. Estimates of monthly streamflow characteristics for sites
2 with streamflow gauging stations are considered to be the most
3 reliable. For those gauge sites where the period of actual
4 streamflow record includes the 1937-86 base period, the estimates
5 of monthly streamflow characteristics are based entirely on
6 recorded streamflows and are considered to be perfectly reliable
7 (zero error). (USGS Report 89-4082, DFWP Exh. 12, p. 14).

8 407. For estimates of streamflow made at ungauged sites,
9 weighted-average flow estimates based on three methods (basin
10 characteristics, channel width, and concurrent measurement) are
11 generally considered to be the most reliable. If only one
12 estimation method is used, the concurrent measurement method
13 generally provides more reliable estimates than any of the other
14 individual estimating methods. (DFWP Exh. 12, p. 16).

15 408. The 18 conservation districts and other objectors to DFWP
16 questioned the validity of the streamflow estimates using the 1937-
17 86 base period because it did not include the drought years prior
18 to 1937 or following 1986. (Elwell Obj., Upper Musselshell Water
19 Users Exh. 2, p. 1).

20 409. The mean annual flow for the base period 1937-86 is more
21 reflective of the long term mean annual flows of streams in the
22 Missouri River basin than is the 1930-90 period. (Parrett Cross,
23 Tr. Day 7, p. 132; Holland-Grasshopper Exhs. 1 and 2 [graphs]).

24 410. Water year 1986 was selected as the ending date because
25 it was the latest complete water year available when the study was
26 begun. Water years 1987-89 were not included because these years
27 were not concluded or even yet begun. Water year 1990 began
28



1 October 1, 1989, three months after DFWP's application was
2 submitted. (Spence Reb., DFWP Exh. 46, pp. 12 and 13).

3 411. When considering the impact of a flood event on the mean
4 annual flow of a stream, a flood discharge does not necessarily
5 affect the mean annual flow, for the year, the mean monthly flow or
6 the long term mean annual flow. (Parrett Cross, Tr. Day 7, p.
7 112).

8 412. The method by which the USGS estimated streamflows for a
9 particular month is different than the measurements a person such
10 as an irrigator might make by measuring through a weir three or
11 four times a day over a period of months. In estimating
12 streamflow, frequent measurements over a weir are not necessarily
13 more accurate than the USGS estimates. Reading a staff gauge or
14 other indicator of the stage of a stream will have a lot of
15 inaccuracy unless the rate of discharge of the stream is measured
16 at the same time. (Parrett Cross, Tr. Day 7, p. 114).

17 413. The streamflow measurement techniques used by the USGS in
18 the water availability study are generally accepted as being
19 suitable techniques for estimating streamflows and have been
20 generally accepted by the hydrology communities. Given the scope
21 of the water availability project, no better techniques could have
22 been used. (Parrett Cross, Tr. Day 7, p. 150).

23 (3) Murphy Rights

24 414. The 1969 Montana Legislature authorized DFWP to file for
25 instream water rights to protect flows on Blue Ribbon trout streams
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1 for fish and wildlife habitat. These rights became known as Murphy
2 Rights after the bill's sponsor. (Bd. Exh. 40, DEIS, p. 61).

3 415. DFWP filed for Murphy Rights on six streams in the
4 Missouri basin. (Bd. Exh. 40, DEIS, Table 4-13, p. 62; Bd. Exh.
5 41, FEIS, Table 4-13, p. 141; Spence Reb., DFWP Exh. 46, Att. A).

6 416. All of the Murphy Rights filed in the Missouri River
7 basin have priority dates in December 1970. (Spence Reb., DFWP
8 Exh. 46, Att. A).

9 417. A comparison of the water right filings on the six Murphy
10 Right streams and the instream reservations requested on those same
11 streams is shown in Table 2. The instream reservations are not
12 additive to the Murphy Rights if granted but are complementary with
13 those Murphy Rights for a given time of year. To the extent they
14 overlap, they would overlap at the same quantities for the periods
15 in which they overlap. (DFWP Stipulation, Tr. Day 8, pp. 139 and
16 140; Nelson Cross, Tr. Day 4, pp. 31 and 32).

17 (4) 50% Limitation

18 418. The amount of instream flow which the Board can grant is
19 limited to no more than 50% of the average annual flow of record on
20 gauged streams. Ungauged streams can be allocated at the
21 discretion of the Board. (85-2-316(6), MCA).

22 419. This limitation in many cases can result in the granting
23 of an instream flow that is too low, thus potentially damaging the
24 existing fishery and impacting future recreational opportunities.
25 (Spence Reb., DFWP Exh. 46, p. 10).
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1 For fish and wildlife and the
2 Rights after the 1970
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Table 2

**Summary of DFWP "Murphy rights" and reservation requests
on Murphy Right streams in the Missouri basin.**

STREAM	<u>MURPHY RIGHT</u>		<u>RESERVATION REQUEST</u>	
	REACH	DATES	AMOUNT CFS	AMOUNT CFS
Madison River	Hebgan Dam to Quake Lake	4/1-7/31	500	1/1-12/31 800
		8/1-3/31	500	
Madison River	Quake Lake to mouth of West Fork	1/1-12/31	500	1/1-12/31 800
Madison River	Mouth of West Fork to Ennis Lake	1/1-5/31	900	1/1-12/31 1,000
		6/1-7/15	1400	
		7/16-12/31	1050	
Madison River	Ennis Lake to mouth	1/1-5/31	1200	1/1-12/31 1,300
		6/1-6/30	1500	
		7/1-7/15	1423	
		7/16-12/31	1300	
West Gallatin River	Yellowstone Park to Shedd's Bridge	5/16-7/15	800	1/1-12/31 170/400
		7/16-5/15	400	
Gallatin River	Mouth to junction with East Gallatin River	5/1-5/15	947	1/1-12/31 1,000
		5/16-5/31	1278	
		6/1-6/15	1500	
		6/16-6/30	1176	
		7/1-8/31	850	
		9/1-4/30	800	
Missouri River	Toston Dam to Canyon Ferry Reservoir	1/1-1/31	2400	1/1-12/31 2,400
		2/1-5/15	2400	
		5/16-6/30	4000	
		7/1-7/15	3816	
		7/16-9/14	2400	
		9/15-12/31	2400	
Missouri River	Holter Dam to mouth of Smith River	1/1-12/31	3000	5/19-7/5 6,398 7/6-5/18 4,100
Smith River	Fort Logan Bridge to confluence of Sheep Creek	5/1-6/30	150	1/1-12/31 90
		7/1-4/30	90	
Smith River	Confluence of Sheep Creek to Cascade-Meagher county line	4/1-4/30	140	1/1-12/31 150
		5/1-6/30	150	
		7/1-8/31	140	
		9/1-3/31	125	
Smith River	Cascade-Meagher county line to confluence of Hound Creek	5/1-5/15	372	1/1-12/31 150
		5/16-6/15	400	
		6/16-6/30	398	
		7/1-4/30	150	
Big Spring Creek	State Fish Hatchery to mouth	1/1-12/31	110	1/1-12/31 110/100

(Bd. Exh. 41 (FEIS) p. 141; Spence Reb. DFWP Exh. 46, Attachment A)

1 420. The 50% limitation can be too restrictive when gauged
2 streams are: 1) badly depleted, 2) spring-fed, 3) regulated, 4)
3 when gauged sites chosen are located at or near the upstream
4 boundary of the designated stream reach, and 5) when all remaining
5 unappropriated flow is needed to protect fishery values. (DFWP
6 72155-41A, Bd. Exh. 37-A.1, p. 1-25).

7 421. There are 36 stream reaches in DFWP's application where
8 the instream flow reservation requests exceed 50% of the average
9 annual flow of record at a gauged site. (Spence Reb., DFWP Exh.
10 46, p. 10; DFWP 72155-41A, Bd. Exh. 37-A.1, pp. 1-30 through 1-
11 31b).

12 422. The flow levels requested for each stream in this
13 application are the flows required to maintain the fishery
14 resources at a desired level. Any flows granted that are less than
15 requested will have some detrimental impacts on the resource.
16 (Spence Reb., DFWP Exh. 46, p. 11).

17 423. The impacts of the 50% limitation can be minimized if any
18 reductions in the flow requests are made during the high flow
19 period of the year (May 15-July 1) rather than during the
20 irrigation season months when flows are already often too low.
21 (Spence Reb., DFWP Exh. 46, p. 11).

22 424. The period of record as a gauged stream should have a
23 minimum of 10 years of record to be used to calculate 50% of the
24 average annual flow. (DFWP 72155-41A, Bd. Exh. 37-A.1, p. 1-28).
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120. The 509 limitation is to be applied to the

entire year 11 daily, when the 509 limitation is

when passed after the 11th day of the month

boundary of the following month, the 509 limitation

is applied to the 11th day of the month

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is applied to the 11th day of the month

125. The 509 limitation is to be applied to the

entire year 11 daily, when the 509 limitation is

when passed after the 11th day of the month

boundary of the following month, the 509 limitation

1 D. FINDINGS THAT THE INSTREAM RESERVATIONS OF WATER APPLIED FOR
2 BY DFWP ARE IN THE PUBLIC INTEREST [MCA § 85-2-316(4)(a)(iv):
3 ARM 36.16.107B(4)]

4 425. For the board to adopt an order reserving water, it must
5 find, in its judgment and discretion, that the reservation is in
6 the public interest, based on a weighing and balancing of the
7 following factors, making a specific finding for each factor.

8 (1) Benefit/Cost Factor

9 426. This factor requires a weighing of the direct and
10 indirect benefits and direct and indirect costs of granting the
11 DFWP instream flow reservations.

12 427. The direct benefits of reserving the requested instream
13 flows include the preservation of the fisheries resources in the
14 basin, and continuation of fishing opportunities, recreational
15 floating, and continued maintenance of existing riparian
16 communities. (Bd. Exh. 37-A.1, DFWP App., Vol. 1, p. 1-33; DFWP
17 Exh. 37, Knudson Dir., p. 5; DFWP Exh. 31, Duffield Dir., Attach.
18 C, DFWP Exh. 28, Casey, p. 2).

19 428. Significant fisheries resources would be protected by
20 DFWP's reservations. DFWP has applied for instream reservations
21 only on those streams with significant fishery resources.
(Findings 27 to 275; DFWP Exh. 37, Knudson Dir., p. 3).

22 429. Portions of the Madison, Big Hole, Gallatin, Beaverhead
23 and Missouri Rivers are nationally known fishing streams. (DFWP
24 Exh. 37, Knudson Dir., p. 3).

25 430. The Ruby, East Gallatin, Jefferson, and Red Rock Rivers
26 are also very important trout streams. (DFWP Exh. 37, Knudson
27 Dir., p. 4).
28

1 431. Tributaries to major rivers serve as vital spawning
2 streams for the larger rivers, as well as habitat for resident
3 fish. (DFWP Exh. 37, Knudson Dir., p. 4).

4 432. Fish migrations from reservoirs and lakes throughout the
5 basin provide important stream fishing opportunities. Tributaries
6 to reservoirs and lakes that contain a trout fishery support
7 spawning runs when adequate habitat, water quality and instream
8 flows exist in these streams. (DFWP Exh. 37, Knudson Dir., p. 4).

9 433. From Great Falls to Fort Peck Reservoir, the Missouri
10 River and its tributaries support a warmwater fishery of
11 significance. (DFWP Exh. 37, Knudson Dir., p. 5).

12 434. Paddlefish are Montana's largest gamefish and reside in
13 this reach of the Missouri River. (Finding 305 to 307).

14 435. Pallid and shovelnose sturgeon also reside in this reach
15 of the Missouri. The pallid sturgeon is listed as an endangered
16 species. (DFWP Exh. 37, Knudson Dir., p. 6).

17 436. The middle Missouri is an under-utilized fishery
18 resource, and opportunities for steady growth in the recreational
19 use of the middle Missouri are very good. (DFWP Exh. 37, Knudson
20 Dir., p. 6).

21 437. The rivers and streams above Canyon Ferry Dam accounted
22 for 375,239 of the total 1,193,000 days spent fishing in Montana
23 during 1985. (DFWP Exh. 37, Knudson Dir., p. 3).

24 438. Several Endangered Species and Species of Special
25 Concern reside in streams in the Missouri River basin. (Findings
26 276 to 277).



1 439. Preserving instream flows will directly benefit
2 recreational floating by helping to maintain existing water depth
3 and velocities on those streams large enough to accommodate canoes,
4 rafts and other types of floating craft. Flows which are
5 sufficient to enable these craft to operate will benefit
6 recreational floaters as well as anglers who float to fish these
7 streams. (DFWP Exh. 37, Knudson Dir., p. 7).

8 440. The Missouri River and its tributaries are extensively
9 used and are popular for floating. (DFWP Exh. 37, Knudson Dir., p.
10 7).

11 441. The portion of the Missouri River from Fort Benton to
12 Fort Peck Reservoir was designated as a National Wild and Scenic
13 River in 1976. (DFWP Exh. 37, Knudson Dir., p. 7; Bd. Exh. 40,
14 DEIS, p. 65).

15 442. DFWP's reservation requests for reaches 4, 5, and 6 of
16 the Missouri River would help preserve the biological,
17 recreational, scenic and historical values of this portion of the
18 Missouri. (DFWP Exh. 37, Knudson Dir., p. 7; Bd. Exh. 37-A.1, DFWP
19 App., p. 1-45).

20 443. Instream flows enhance the attributes of river bottom
21 lands by keeping riparian plant communities healthy and viable, and
22 by providing habitat for wildlife and birds that people enjoy.
23 (DFWP Exh. 28, Casey Dir., p. 2; DFWP Exh. 37, Knudson Dir., p. 7).

24 444. Maintenance of existing riparian vegetation provides the
25 benefit of dampening the effects of flooding through erosion
26 control, and supplying organic material to the aquatic system,
27 enhancing its productivity. (DFWP Exh. 28, Casey Dir., p. 5).
28



1 445. Maintaining instream flows would provide indirect
2 benefits for hydropower production, pollution control, and public
3 health. (DFWP Exh. 39, Elliott Dir., p. 3).

4 446. During the drought year of 1988, the mean arsenic
5 concentration in August at Toston was nearly twice the federal
6 drinking water standard. Arsenic concentrations were high because
7 of low flows in the Jefferson and Gallatin Rivers. (DFWP Exh. 39,
8 Elliott, Dir., p. 4).

9 447. Instream flow reservations will maintain water quality
10 by diluting carcinogenic substances, such as arsenic, and other
11 toxic substances in the Missouri basin. (DFWP Exh. 39, Elliott
12 Dir., p. 4).

13 448. Streamflow dilution provided by instream flows would
14 help maintain safe drinking water supplies for municipalities and
15 individuals that take drinking water from the Missouri and Madison
16 Rivers. (DFWP Exh. 39, Elliott Dir., p. 4).

17 449. Maintaining instream flows through a reservation would
18 help maintain existing water volumes to dilute wastewater
19 discharges from municipalities and industrial sources, as well as
20 return flows from irrigation. (DFWP Exh. 39, Elliott Dir., p. 4).

21 450. Instream flow reservations would help maintain the
22 electrical generating capacity of hydropower plants on the Missouri
23 River. (DFWP Exh. 39, Elliott Dir., p. 3).

24 451. Instream flow reservations and flows required for
25 hydropower generation are mutually beneficial. (DFWP Exh. 37,
26 Knudson Dir., p. 9).

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1 452. Stream-based recreation has a significant economic
2 impact in Montana, and tourism-related businesses constitute an
3 expanding industry in Montana. DFWP's instream flow reservation
4 would help protect the outstanding scenic and recreational values
5 that attract tourists to Montana. (DFWP Exh. 37, Knudson Dir., p.
6 9).

7 453. River-based outfitting businesses, as well as service
8 sector businesses, including motels, campgrounds, restaurants and
9 sporting good stores, benefit from maintenance of adequate instream
10 flows. (DFWP Exh. 37, Knudson Dir., p. 9).

11 454. Recreational and aesthetic attributes of rivers and
12 streams attract new businesses and economically independent
13 residents to Montana. (DFWP Exh. 37, Knudson Dir., p. 10).

14 455. If DFWP's reservations are granted, existing water users
15 would be provided with assurances of future water availability.
16 Reserved instream flows will help maintain water levels at existing
17 headgates and provide a legal buffer to future water development
18 plans. (DFWP Exh. 37, Knudson Dir., p. 11; DFWP Exh. 10, Graham
19 Dir., p. 7).

20 456. Direct costs to DFWP of an instream reservation include
21 monitoring streamflows on certain stream reaches. DFWP may have to
22 install some gauging stations and may have some administrative
23 costs to implement its reservation program, but these costs will be
24 slight. (DFWP Exh. 37, Knudson Dir., p. 12; Bd. Exh. 37-A.1, DFWP
25 App., p. 1-91).

26 457. Reservations of instream flows in the Missouri River
27 basin would have no indirect costs to existing industrial water
28



1 users, but may affect future use of water by industries, primarily
2 mining. (DFWP Exh. 39, Elliott Dir., p. 5; DFWP Exh. 37, Knudson
3 Dir., p. 13).

4 458. Water for industrial development could be supplied from
5 other sources, such as groundwater, storage or purchase of existing
6 water rights. (DFWP Exh. 39, Elliott Dir., p. 5; DFWP Exh. 37,
7 Knudson Dir., p. 13).

8 459. The possibility of indirect costs to industry is not
9 significant, and has not been quantified. (Bd. Exh. 41, FEIS, p.
10 S-8; DFWP Exh. 39, Elliott Dir., p. 5; DFWP Exh. 37, Knudson Dir.,
11 p. 13).

12 460. Instream flow reservations will not have adverse impacts
13 on existing irrigation water rights, nor would they preclude the
14 use of groundwater or storage for the development of additional
15 irrigation. (Bd. Exh. 41, FEIS, pp. 55, 108; DFWP Exh. 37, Knudson
16 Dir., p. 13).

17 461. Instream reservations are not inconsistent with the
18 water storage section of the state's water plan. (Bd. Exh. 41,
19 FEIS, p. 71).

20 462. There are presently about 8,500 storage projects in the
21 Missouri River basin upstream from Fort Peck Dam. If existing
22 trends continue, few new storage projects will be built over the
23 next 25 years because of existing environmental, financial and
24 economic constraints, and because storage projects have already
25 been constructed at many of the best sites. (Bd. Exh. 40, DEIS,
26 pp. 66, 237).



1 463. Instream flow reservations could not command the release
2 of stored water, whether under pre-July 1, 1985 rights or post-July
3 1, 1985 rights. (DFWP Exh. 46, Spence Reb., p. 4).

4 464. Instream flow reservations may have some indirect costs
5 to existing water right holders, if the reservants object to
6 changes in existing rights. All junior water right holders,
7 including reservants, have the right to object to changes in senior
8 water rights. (DFWP Exh. 11, Spence Dir., p. 7). Such objections
9 are not impacts on existing water rights, but only on changes to
10 those rights.

11 465. Reservant's objections, if any, may increase transaction
12 costs for existing water right holders who wish to transfer or
13 otherwise change water rights. (Tr. Day 10, Duffield Cross, p.
14 171). An objection may, in some cases, prevent a change from
15 occurring, but only if flows at DFWP's monitoring point are
16 decreased as a result of the change. (Finding No. 519).

17 466. DFWP's history of objections to changes in water rights
18 with respect to its "Murphy" rights and Yellowstone basin
19 reservation rights, shows that it objects infrequently to such
20 changes. (DFWP Exh. 11, Spence Dir., p. 7).

21 467. There is little or no risk that an existing water right
22 holder will not be able to beneficially use water on account of an
23 objection to a change from an instream reservant. (Findings 522-
24 525).

25 468. Objectors to instream reservations in this proceeding
26 have not quantified any indirect costs to existing water right
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443. Instructed to prepare a report on the
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holders, which would result from granting the instream reservations. (Tr. Day 10, Duffield Cross, pp. 67-171).

469. The indirect costs that may result to existing water right holders by granting instream reservations are minor, and not significant in comparison to the other benefits and costs which have been quantified. (Tr. Day 10, Duffield Cross, p. 67, 171).

470. The costs of applying for the reservations and of conducting the contested case hearing are not direct or indirect costs in the benefit/cost test. [DFWP Exh. 31, Duffield Dir., Attach. C; ARM 36.16.102(7)].

471. For DFWP's instream reservations, the benefits and costs to be considered may be summarized as follows:

Direct Benefits	Fish, Wildlife and Recreation Fisheries Maintenance, Fishing Opportunities, Riparian Protection
Indirect Benefits	Hydropower Water Quality
Direct Costs	DFWP Fishery/Recreation Enforcement
Indirect Costs	Foregone Water Consumption for Irrigation or Other Uses

(DFWP Exh. 31, Duffield Dir., Attach. C; Findings 425-470).

472. Under the Instream Alternative described by DNRC in the EIS, all municipal applications would be given first priority, all instream applications would be given second priority and marginally feasible irrigation projects would be given third priority. (Bd. Exh. 40, DEIS, p. 133).

1 473. Taken as a whole, this alternative has net benefits of
2 \$327.2 million, and since it provides the greatest net benefits,
3 appears to be in the public interest. (Bd. Exh. 41, FEIS, p. S-8).

4 474. DNRC's analysis of the benefits and costs to be realized
5 from granting instream flow reservations did not place values on
6 existing instream flows as direct benefits that are realized by the
7 instream flow reservants. (DFWP Exh. 31, Duffield Dir., p. 3-4;
8 Bd. Exh. 41, FEIS, p. 36).

9 475. Positive direct benefits are realized by an instream
10 flow reservant by maintaining status quo flow levels, and they
11 should be included in the benefit/cost analysis. Rights of
12 instream use need to be established to provide security of supply.
13 It is not necessary to have known competing uses, with associated
14 opportunity costs, to value existing instream uses as direct
15 benefits to the reservant. (DFWP Exh. 48, Duffield Reb., p. 3;
16 Tr. Day 10, Duffield Cross, pp. 68-70).

17 476. With respect to instream flow requests where there are
18 competing uses for irrigation, the valuation of water allocations
19 may be performed from either the standpoint of a positive increase
20 in the diversionary use (irrigation) or from the standpoint of a
21 decrease in instream flows, because they are symmetrical. A
22 negative number for net benefits from irrigation means that
23 instream flows have positive net benefits. DNRC's analysis was
24 from the standpoint of the consumptive change in status quo. (DFWP
25 Exh. 48, Duffield Reb., p. 3).

26 477. Taken as a whole, the net benefits of granting DFWP's
27 instream reservations where there are competing uses is \$188.6
28

1 million (symmetric to the negative benefits of granting all
2 irrigation projects). (DFWP Exh. 31, Duffield Dir., p. 22).

3 478. In order to determine the efficient or optimal
4 allocation of water that yields the highest net benefits, it is
5 necessary to identify the set of reservation requests, i.e., the
6 combination of competing irrigation and instream reservations, that
7 yields the highest net benefits. (Bd. Exh. 41, FEIS, p. 38; DFWP
8 Exh. 31, Duffield Dir., p. 6).

9 479. There are 242 instream use requests by DFWP on streams
10 or stream reaches where there are no conflicts with proposed
11 consumptive use reservation requests. (Bd. Exh. 40, DEIS, p. 255,
12 Table 3; Bd. Exh. 41, FEIS, p. 196, Revised Table K-3).

13 480. The instream reservation requests with no competition
14 from other uses are shown in Table 3 attached hereto. (Bd. Exh.
15 40, DEIS, App. K., Table K-3; Bd. Exh. 41, FEIS, p. 196).

16 481. A reservation for these streams and stream reaches in
17 the amounts requested by DFWP will protect existing instream uses.
18 A reservation for these streams and stream reaches have direct
19 benefits to the reservant because a reservation provides legal
20 protection for continued instream water use. (Bd. Exh. 40, DEIS,
21 p. 254; DFWP Exh. 48, Duffield Reb., p. 3; Tr. Day 10, Duffield
22 Cross, p. 69).

23 482. The direct benefit to DFWP and the public from the
24 recreation, fish and wildlife values in these reaches with no
25 competing claims is about \$32 million per year. (DFWP Exh. 31,
26 Duffield Dir., p. 19).

Table 3

Table K-3. Reservation requests for instream flows on streams with no competing requests

APPLICANT	STREAM	FISHERIES VALUE CLASS ^c	APPLICANT	STREAM	FISHERIES VALUE CLASS ^c
GALLATIN RIVER DRAINAGE			DFWP	South Boulder River	3 ^b
DFWP	Baker Creek	2	DFWP	South Willow Creek	3
DFWP	Big Bear Creek	a	DFWP	North Willow Creek	3
DFWP	Bridger Creek	4	DFWP	Willow Creek	2
DFWP	Cache Creek	4	DFWP	Little Boulder River	4
DFWP	East Fork Hyalite Creek	2	BIG HOLE RIVER DRAINAGE		
DFWP	Gallatin River #1	2	DFWP	South Fork Big Hole River	a
DFWP	Hell Roaring Creek	a	DFWP	Big Hole River #1	1
DFWP	Hyalite Creek #1	3 ^b	DFWP	Big Hole River #2	1
DFWP	Middle Fork West Fork Gallatin River	4	DFWP	Big Hole River #3	1
DFWP	Porcupine Creek	4	DFWP	Warm Springs Creek	3
DFWP	Reese Creek	2	DFWP	Miner Creek	1
DFWP	Rocky Creek	2	DFWP	Rock Creek	1
DFWP	South Cottonwood Creek	6	DFWP	Big Lake Creek	1
DFWP	South Fork Spanish Creek	4	DFWP	Francis Creek	2
DFWP	South Fork West Fork Gallatin River	4	DFWP	Steel Creek	1
DFWP	Spanish Creek	1	DFWP	Swamp Creek	1
DFWP	Squaw Creek	1	DFWP	Joseph Creek	3
DFWP	Taylor Fork	3	DFWP	Trail Creek	3
DFWP	West Fork Gallatin River	1	DFWP	Ruby Creek	3
DFWP	West Fork Hyalite Creek	2	DFWP	Johnson Creek	3
DFWP	East Gallatin River #1	2	DFWP	Mussigbrod Creek	2
MADISON RIVER DRAINAGE			DFWP	North Fork Big Hole River	1
DFWP	Madison River #1	1	DFWP	Pintlar Creek	3 ^b
DFWP	Black Sand Spring Creek	2	DFWP	Fishtrap Creek	3 ^b
DFWP	Cougar Creek	3	DFWP	LaMarche Creek	3
DFWP	Duck Creek	3	DFWP	Seymour Creek	3
DFWP	Grayling Creek	a	DFWP	Sullivan Creek	a
DFWP	Red Canyon Creek	a	DFWP	Twelvemile Creek	a
DFWP	Watkins Creek	a	DFWP	Corral Creek	3
DFWP	Trapper Creek	a	DFWP	Tenmile Creek	a
DFWP	Cabin Creek	4	DFWP	Sevenmile Creek	a
DFWP	Beaver Creek	4	DFWP	Sixmile Creek	a
DFWP	Antelope Creek	2	DFWP	Oregon Creek	a
DFWP	Elk River	4	DFWP	California Creek	a
DFWP	West Fork Madison River	3	DFWP	American Creek	a
DFWP	Standard Creek	4	DFWP	French Creek	4
DFWP	Squaw Creek	4	DFWP	Governor Creek	1
DFWP	Ruby Creek	3	DFWP	Deep Creek	3
DFWP	Indian Creek	4	DFWP	Bear Creek	3
DFWP	Blaine Spring Creek	2	DFWP	Bryant Creek	a
DFWP	O'Dell Spring Creek	a	DFWP	Jacobsen Creek	a
DFWP	Jack Creek	3	DFWP	Wyman Creek	4
DFWP	Moore Creek	2 ^b	DFWP	Pattengail Creek	3
DFWP	North Meadow Creek	3	DFWP	Wise River	3
DFWP	Hot Springs Creek	4	DFWP	Delano Creek	a
DFWP	Cherry Creek	4	DFWP	Jerry Creek	4
DFWP	Madison River #2	1	DFWP	Divide Creek	3
DFWP	Madison River #3	1	DFWP	Canyon Creek	3
JEFFERSON AND BOULDER RIVER DRAINAGES			DFWP	Moose Creek	3
DFWP	Boulder River #1	4	DFWP	Trapper Creek	4
DFWP	Hells Canyon Creek	2 ^b	DFWP	Camp Creek	4
DFWP	Willow Spring Creek	2	DFWP	Willow Creek	3
DFWP	Halfway Creek	1 ^b			
DFWP	Whitetail Creek	4			

Station	Depth (m)	Temperature (°C)	Salinity (psu)	Density (kg/m³)	Speed of Sound (m/s)	Time of Day	Date
1	0	15.5	35.2	1025.2	1497.5	08:00	10/10/00
1	10	15.2	35.2	1025.2	1497.5	08:00	10/10/00
1	20	14.8	35.2	1025.2	1497.5	08:00	10/10/00
1	30	14.5	35.2	1025.2	1497.5	08:00	10/10/00
1	40	14.2	35.2	1025.2	1497.5	08:00	10/10/00
1	50	14.0	35.2	1025.2	1497.5	08:00	10/10/00
1	60	13.8	35.2	1025.2	1497.5	08:00	10/10/00
1	70	13.5	35.2	1025.2	1497.5	08:00	10/10/00
1	80	13.2	35.2	1025.2	1497.5	08:00	10/10/00
1	90	13.0	35.2	1025.2	1497.5	08:00	10/10/00
1	100	12.8	35.2	1025.2	1497.5	08:00	10/10/00
1	110	12.5	35.2	1025.2	1497.5	08:00	10/10/00
1	120	12.2	35.2	1025.2	1497.5	08:00	10/10/00
1	130	12.0	35.2	1025.2	1497.5	08:00	10/10/00
1	140	11.8	35.2	1025.2	1497.5	08:00	10/10/00
1	150	11.5	35.2	1025.2	1497.5	08:00	10/10/00
1	160	11.2	35.2	1025.2	1497.5	08:00	10/10/00
1	170	11.0	35.2	1025.2	1497.5	08:00	10/10/00
1	180	10.8	35.2	1025.2	1497.5	08:00	10/10/00
1	190	10.5	35.2	1025.2	1497.5	08:00	10/10/00
1	200	10.2	35.2	1025.2	1497.5	08:00	10/10/00
1	210	10.0	35.2	1025.2	1497.5	08:00	10/10/00
1	220	9.8	35.2	1025.2	1497.5	08:00	10/10/00
1	230	9.5	35.2	1025.2	1497.5	08:00	10/10/00
1	240	9.2	35.2	1025.2	1497.5	08:00	10/10/00
1	250	9.0	35.2	1025.2	1497.5	08:00	10/10/00
1	260	8.8	35.2	1025.2	1497.5	08:00	10/10/00
1	270	8.5	35.2	1025.2	1497.5	08:00	10/10/00
1	280	8.2	35.2	1025.2	1497.5	08:00	10/10/00
1	290	8.0	35.2	1025.2	1497.5	08:00	10/10/00
1	300	7.8	35.2	1025.2	1497.5	08:00	10/10/00
1	310	7.5	35.2	1025.2	1497.5	08:00	10/10/00
1	320	7.2	35.2	1025.2	1497.5	08:00	10/10/00
1	330	7.0	35.2	1025.2	1497.5	08:00	10/10/00
1	340	6.8	35.2	1025.2	1497.5	08:00	10/10/00
1	350	6.5	35.2	1025.2	1497.5	08:00	10/10/00
1	360	6.2	35.2	1025.2	1497.5	08:00	10/10/00
1	370	6.0	35.2	1025.2	1497.5	08:00	10/10/00
1	380	5.8	35.2	1025.2	1497.5	08:00	10/10/00
1	390	5.5	35.2	1025.2	1497.5	08:00	10/10/00
1	400	5.2	35.2	1025.2	1497.5	08:00	10/10/00
1	410	5.0	35.2	1025.2	1497.5	08:00	10/10/00
1	420	4.8	35.2	1025.2	1497.5	08:00	10/10/00
1	430	4.5	35.2	1025.2	1497.5	08:00	10/10/00
1	440	4.2	35.2	1025.2	1497.5	08:00	10/10/00
1	450	4.0	35.2	1025.2	1497.5	08:00	10/10/00
1	460	3.8	35.2	1025.2	1497.5	08:00	10/10/00
1	470	3.5	35.2	1025.2	1497.5	08:00	10/10/00
1	480	3.2	35.2	1025.2	1497.5	08:00	10/10/00
1	490	3.0	35.2	1025.2	1497.5	08:00	10/10/00
1	500	2.8	35.2	1025.2	1497.5	08:00	10/10/00
1	510	2.5	35.2	1025.2	1497.5	08:00	10/10/00
1	520	2.2	35.2	1025.2	1497.5	08:00	10/10/00
1	530	2.0	35.2	1025.2	1497.5	08:00	10/10/00
1	540	1.8	35.2	1025.2	1497.5	08:00	10/10/00
1	550	1.5	35.2	1025.2	1497.5	08:00	10/10/00
1	560	1.2	35.2	1025.2	1497.5	08:00	10/10/00
1	570	1.0	35.2	1025.2	1497.5	08:00	10/10/00
1	580	0.8	35.2	1025.2	1497.5	08:00	10/10/00
1	590	0.5	35.2	1025.2	1497.5	08:00	10/10/00
1	600	0.2	35.2	1025.2	1497.5	08:00	10/10/00

Table 3 (continued)

Table K-3 (continued)

APPLICANT	STREAM	FISHERIES VALUE CLASS ^c	APPLICANT	STREAM	FISHERIES VALUE CLASS ^c
DFWP	Birch Creek	4	DFWP	Poindexter Slough	1
BLM	Deep Creek	3	DFWP	East Fork Blacktail Deer Creek	3 ^b
BLM	Bear Creek	3	DFWP	West Fork Blacktail Deer Creek	4
BLM	Canyon Creek	3	DFWP	Blacktail Deer Creek	3 ^b
BLM	Moose Creek	3	BLM	Hell Roaring Creek	1
BLM	Camp Creek	4	BLM	Corral Creek	2
BLM	Willow Creek	3	BLM	Tom Creek	3
RUBY RIVER DRAINAGE			BLM	Odell Creek	2
DFWP	Ruby River #1	3 ^b	BLM	Jones Creek	3
DFWP	Ruby River #2	2	BLM	Peet Creek	2
DFWP	Coal Creek	a	BLM	Long Creek	3
DFWP	Middle Fork Ruby River	a	BLM	Indian Creek	2
DFWP	East Fork Ruby River	4	BLM	Cabin Creek	2
DFWP	West Fork Ruby River	4	BLM	Simpson Creek	2
DFWP	Cottonwood Creek	3 ^b	BLM	Deadman Creek	2
DFWP	Warm Spring Creek	3 ^b	BLM	Big Sheep Creek	2 ^b
DFWP	North Fork Greenhorn Creek	1	BLM	Black Canyon Creek	a
DFWP	Mill Creek	4	BLM	Frying Pan Creek	a
DFWP	Wisconsin Creek	5	BLM	Trapper Creek	a
BLM	North Fork Greenhorn Creek	1	BLM	Bear Creek	2
BEAVERHEAD RIVER DRAINAGE			BLM	Rape Creek	1
DFWP	Beaverhead River #1	1	BLM	Bloody Dick Creek	3
DFWP	Red Rock River #1	2 ^b	BLM	Medicine Lodge Creek	3
DFWP	Red Rock River #2	2 ^b	BLM	East Fork Dyce Creek	a
DFWP	Red Rock Creek	1 ^b	BLM	West Fork Dyce Creek	a
DFWP	Hell Roaring Creek	1 ^b	BLM	East Fork Blacktail Deer Creek	3 ^b
DFWP	Corral Creek	2	BLM	West Fork Blacktail Deer Creek	4 ^b
DFWP	Tom Creek	3	BLM	Shenon Creek	4
DFWP	Narrows Creek	2	BLM	Trapper Creek	a
DFWP	Odell Creek	2	MISSOURI RIVER DRAINAGE - THREE FORKS TO HOLTER DAM		
DFWP	Jones Creek	3	DFWP	Avalanche Creek	4
DFWP	Peet Creek	2	DFWP	Beaver Creek	3
DFWP	Long Creek	3	DFWP	Confederate Gulch	4
DFWP	East Fork Clover Creek	4	DFWP	Crow	
DFWP	Indian Creek	2	DFWP	Dry Creek	3 ^b
DFWP	Cabin Creek	2	DFWP	Duck Creek	4
DFWP	Simpson Creek	2	DFWP	Sixteen Mile Creek	3
DFWP	Deadman Creek	3	DFWP	Cottonwood Creek	4
DFWP	Big Sheep Creek	2 ^b	DFWP	Willow Creek	3
DFWP	Black Canyon Creek	a	DFWP	Beaver Creek	3 ^b
DFWP	Shenon Creek	4	DFWP	Prickly Pear Creek	2^b
DFWP	Frying Pan Creek	a	DFWP	Tenmile Creek	4^a
DFWP	Trapper Creek	a	DFWP	Sevenmile Creek	4
DFWP	Bear Creek	2	DFWP	Silver Creek	3
DFWP	Rape Creek	1	DFWP	Trout Creek	3
DFWP	Bloody Dick Creek	3	DFWP	McGuire Creek	a
DFWP	Browns Canyon Creek	a	DFWP	Canyon Creek	4
DFWP	Medicine Lodge Creek	3	DFWP	Little Prickly Pear Creek #1	2
DFWP	Horse Prairie Creek	3 ^b	DFWP	Little Prickly Pear Creek #2	2
DFWP	East Fork Dyce Creek	a	DFWP	Lyons Creek	2
DFWP	West Fork Dyce Creek	a	DFWP	Spokane Creek	3
DFWP	Reservoir Creek	a	DFWP	Virginia Creek	4
DFWP	Grasshopper Creek	4	DFWP	Wolf Creek	3

K-6

Table K-3 (continued)

APPLICANT	STREAM	FISHERIES VALUE CLASS ^c	APPLICANT	STREAM	FISHERIES VALUE CLASS ^c
MISSOURI RIVER DRAINAGE - HOLTER DAM TO BELT CREEK			TETON RIVER DRAINAGE		
DFWP	Sheep Creek	3	DFWP	McDonald Creek	4
DFWP	Wegner Creek	a	DFWP	South Fork Deep Creek	4
DFWP	Stickney Creek	3	DFWP	North Fork Deep Creek	2
DEARBORN RIVER DRAINAGE			DFWP	Deep Creek	4
DFWP	Middle Fork Dearborn River	4	DFWP	Spring Creek	3
DFWP	South Fork Dearborn River	4	DFWP	Antelope Butte Swamp	NA
DFWP	Flat Creek	4	MISSOURI RIVER DRAINAGE - BELT CREEK TO FORT PECK DAM		
DFWP	Bean Lake	NA	DFWP	Cow Creek	6
SMITH RIVER DRAINAGE			DFWP	Highwood Creek (upper)	3 ^b
DFWP	South Fork Smith River	a	DFWP	Shonkin Creek (upper)	3
DFWP	North Fork Smith River	a	JUDITH RIVER DRAINAGE		
DFWP	Newlan Creek	4	DFWP	Middle Fork Judith River	a
DFWP	Big Birch Creek	4	DFWP	Beaver Creek	4
DFWP	Sheep Creek	2 ^b	DFWP	Cottonwood Creek	4
DFWP	Eagle Creek	4	DFWP	Lost Fork Judith River	6
DFWP	Rock Creek	3	DFWP	Yogo Creek	4
DFWP	Tenderfoot Creek	3	DFWP	South Fork Judith River	6
DFWP	North Fork Deep Creek	a	MUSSELHELL RIVER DRAINAGE		
SUN RIVER DRAINAGE			DFWP	Musselshell River #1	6
DFWP	North Fork Willow Creek	a	DFWP	South Fork Musselshell River	4
DFWP	Willow Creek	4	DFWP	Alabaugh Creek	4
DFWP	Ford Creek	4	DFWP	Cottonwood Creek	4
DFWP	Elk Creek	3	DFWP	North Fork Musselshell River #1	3
BELT CREEK DRAINAGE			DFWP	North Fork Musselshell River #2	3
DFWP	Belt Creek #1	3	DFWP	Checkerboard Creek	4
DFWP	Dry Fork Belt Creek	3	DFWP	Spring Creek	4
DFWP	Tillinghast Creek	3	DFWP	Big Elk Creek	4
DFWP	Pilgrim Creek	2	DFWP	American Fork Creek	4
DFWP	Logging Creek	4	DFWP	Careless Creek	a
MARIAS RIVER DRAINAGE			DFWP	Swimming Woman Creek	a
DFWP	South Fork Dupuyer Creek	2	DFWP	Collar Gulch Creek	a
DFWP	North Fork Dupuyer Creek	3	DFWP	Flatwillow Creek	4
DFWP	Dupuyer Creek	4	FORT PECK RESERVOIR DRAINAGE		
DFWP	South Badger Creek	3	DFWP	Big Dry Creek	3 ^b
DFWP	North Badger Creek	1 ^b	DFWP	Little Dry Creek	a
DFWP	Badger Creek	3	^a some or all reaches unclassified ^b some reaches have lower classification ^c 1 = outstanding fisheries resource 2 = high value fisheries resource 3 = substantial fisheries resource 4 = moderate fisheries resource 5 = limited fisheries resource 6 = unrated		
DFWP	South Fork Two Medicine River	2			

1 483. The direct and indirect costs of granting the instream
2 reservation requests where there are no competing uses are
3 negligible. (Findings 462 and 474).

4 484. Other potential new water uses with higher values have
5 not been identified in these reaches, so the benefits of granting
6 these requests substantially exceed the nominal direct and indirect
7 costs. (Bd. Exh. 40, DEIS, p. 255; DFWP Exh. 31, Duffield Dir., p.
8 18-19).

9 485. The value per acre-foot of water for irrigation for each
10 project should be compared to the value of that water for instream
11 uses, which include hydropower generation, fish and wildlife,
12 recreation and water quality. The use with the highest value
13 passes the benefit/cost test. This value comparison is set forth
14 in Findings 595-598, with respect to the consumptive requests.
15 (Bd. Exh. 41, FEIS, p. 38).

16 486. The value of an acre-foot of water for all 17 of the
17 remaining municipal applications exceeds the estimated value for
18 instream uses. (Bd. Exh. 41, FEIS, Appendix B).

19 487. The remaining instream flow requests, for which there
20 are competing consumptive irrigation uses, all have instream values
21 greater than such consumptive use values, when all quantifiable and
22 unquantifiable values are considered. A comparison of such values
23 is set forth in Irrigation Findings. (Findings 600-618).

24 488. The benefits of granting all instream flows requested
25 exceed the indirect costs to foregone irrigation and all other
26 direct and indirect costs. (Finding 473).

1 (2) Net Benefits of Reservation Greater than Net Benefits of
2 Not Granting the Reservation [ARM 36.16.107B(4)(b)]

3 489. By definition, "net benefits" mean indirect and direct
4 benefits less indirect and direct costs. Indirect costs include
5 economic opportunity costs that the requested flow reservations may
6 have to parties other than the reservant. [ARM 36.16.107B(4)(b)].
7 Thus, this factor is similar to the benefit/cost criteria upon
8 which findings of fact have been made above.

9 490. A no-action alternative to granting instream flow
10 reservations would result in costs to recreation, fish and
11 wildlife, aesthetic qualities and other economics. In some cases,
12 further consumptive appropriations will result in detrimental
13 affects to aquatic life, wildlife and recreation. (DFWP Exh. 38,
14 p. 75; Bd. Exh. 40, DEIS, p. 237).

15 491. Other alternative actions could be taken to improve or
16 protect instream flows, such as intensification of water
17 conservation measures, leasing of water rights, constructing
18 offstream storage facilities, conditioning water permits, closing
19 basins and applying the public trust doctrine. (DFWP Exh. 38, pp.
20 75-84).

21 492. These alternatives are either more costly, limited in
22 applicability, legally untested or logistically infeasible for
23 basin-wide utilization. (DFWP Exh. 37, Knudson Dir., p. 15).

1 (3) Reasonable Alternatives with Greater Net Benefits

2 493. These findings of fact have identified the optimal set
3 of reservation requests with the greatest net benefits. (Findings
4 484-488, 760-766).

5 494. There are no other reasonable alternatives with greater
6 net benefits. (Bd. Exh. 41, FEIS, pp. S-8, 34).

7
8 (4) Irretrievable Loss of a Natural Resource

9 495. Depending on the location, timing, and amount of water
10 diverted, new water use permits will cause an irretrievable loss of
11 water quality, fisheries, and opportunities for recreation. (Bd.
12 Exh. 40, DEIS, p. 244).

13 496. Incremental streamflow depletions will continue to
14 reduce critical components of the natural environment, including
15 fishery resources, wildlife riparian areas and water quality.
16 (DFWP Exh. 38, p. 73).

17 497. Reservations for instream flow are the only way to
18 protect streamflow for water quality, fisheries and recreation on
19 nearly all streams where such reservations are requested. (Bd.
20 Exh. 40, DEIS, p. 244).

21 498. The competing applications for consumptive uses of water
22 throughout the basin in this proceeding demonstrate there is a
23 reasonable likelihood that such competing water uses would result
24 in an irretrievable loss of a natural resource if instream flow
25 reservations were not granted. (Findings 623-742).

12. _____

13. _____

14. _____

15. _____

16. _____

17. _____

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24. _____

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1 (5) Adverse Impacts to Public Health, Safety and Welfare

2 499. DFWP's instream flow reservation would not have adverse
3 impacts to public health, safety and welfare. (Bd. Exh. 40, DEIS,
4 pp. 243-244; DFWP Exh. 38, p. 42).

5 500. The impacts to public health, safety and welfare from
6 instream flow reservations are positive and beneficial. (Bd. Exh.
7 40, DEIS, pp. 243-244; DFWP Exh. 38, pp. 41-42).

8
9 (6) Other Factors

10 501. The instream flows requested by DFWP are necessary to
11 maintain the existing resident fish populations, to provide passage
12 for migratory fish species in certain streams, to protect spawning
13 and rearing habitats of both resident and migratory species, to
14 protect the habitats of game fish "Species of Special Concern" such
15 as the westslope cutthroat trout, Arctic grayling, pallid sturgeon
16 and paddlefish, as well as nongame species such as sturgeon chub,
17 sickelfin chub and the northern redbelly dace x finescale dace
18 hybrid. The requested flows are also necessary to help protect the
19 habitat for those wildlife species which depend on the streams and
20 their riparian zones for food, water and shelter, including the
21 bald eagle, peregrine falcon, whooping crane and grizzly bear, all
22 of which are threatened or endangered species. (DFWP 72155-41A,
23 Bd. Exh. 37-A.2 and 37-A.3, inclusive).

1 (7) Summary -- Public Interest, DFWP Application

2 502. Based on the foregoing findings of fact, DFWP's
3 application for instream flow reservations on 281 stream reaches,
4 one lake and one swamp is in the public interest.

5 503. DFWP's reservations should have second priority to the
6 municipal reservations.

7 504. DFWP's reservation should have priority over the
8 conservation district and BUREC reservations identified in Findings
9 764-765).

10 505. In those streams and stream reaches where DFWP's
11 instream flow reservations overlap with DHES's and BLM's instream
12 requests, all such reservations should be concurrent, rather than
13 cumulative. (Bd. Exh. 40, DEIS, p. 11; Bd. Exh. 41, FEIS, p. 68).

14 506. In those streams and stream reaches where DFWP already
15 has instream flow rights, the amount of water reserved should be
16 concurrent with such prior right, rather than cumulative. (Finding
17 416).

18
19 E. FINDINGS ON THE MANAGEMENT PLAN (ARM 36.16.107B(7))

20 507. DFWP has a management plan for measuring, protecting,
21 and reporting on instream reservations. (DFWP 72155-41A, Bd. Exh.
22 37-A.1, pp. 1-90 through 1-95 and 1-106 (Appendix B); DFWP Exh. 10,
23 Graham Dir., pp. 5 and 6; DFWP Exh. 17, Spence Dir., pp. 7 through
24 10).

25 508. The management plan is modeled after the process DFWP
26 has followed for its Yellowstone reservations. (DFWP 72155-41A,
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28

1 Bd. Exh. 37-A.1, pp. 1-91 through 1-93; DFWP Exh. 10, Graham Dir.,
2 p. 5).

3 509. DFWP will notify new junior water use permit holders
4 when a instream water reservation exists in the source of supply,
5 either through a letter or the permit process. DFWP will object
6 and request denial of permits only when the use of the water would
7 routinely interfere with an instream reservation. Otherwise, in
8 its objections to new permits, DFWP will request that the permit be
9 specifically conditioned to the senior instream flow reservation.
10 (DFWP 72155-41A, Bd. Exh. 37-A.1, p. 1-92; DFWP Exh. 10, Graham
11 Dir., p. 5).

12 510. When low flow or drought years threaten instream
13 reservations, DFWP will initially advise junior users by letter of
14 potential low flow conditions and, when flows deteriorate below
15 instream reservations, junior water users will be requested by mail
16 to cease their diversions until flows again rise above the
17 reservations. (DFWP 72155-41A, Bd. Exh. 37-A.1, pp. 1-92 and 1-93;
18 DFWP Exh. 10, Graham Dir., pp. 5 and 6; DFWP Exh. 19, Chronology of
19 Enforcement Actions; Tr.-Day 8, Spence, p. 76).

20 511. Implementation of an instream flow reservation
21 management plan for monitoring and protection of instream
22 reservations will be an evolutionary process. The timing and
23 degree of the monitoring of individual streams will depend on the
24 extent of junior water use in and above a stream reach. (DFWP
25 72155-41A, Bd. Exh. 37-A.1, pp. 1-90 and 1-91; DFWP Exh. 10, Graham
26 Dir., p. 5).

1 512. As circumstances require, DFWP may need to request DNRC
2 to exercise its authority to enforce compliance by junior permit
3 holders, or may need to use water commissioners, if legally
4 available for reservations, to distribute water according to
5 priority dates, or may need to use any other enforcement remedies
6 available to a water right holder. (DFWP 72155-41A, Bd. Exh. 37-
7 A.1, p. 1-93; DFWP Exh. 10, Graham Dir., p. 6).

8 513. Enforcement of instream reservations can restrict only
9 junior consumptive users or those diverting water without a right,
10 such as the expansion of a senior right beyond the quantity of
11 water the senior is entitled to use. (DFWP 72155-41A, Bd. Exh. 37-
12 A.1, pp. 1-90; DFWP Exh. 10, Graham Dir., pp. 6 and 7).

13 514. Instream reservations will be monitored and measured
14 using a "reach concept". DFWP has applied for instream
15 reservations on designated stream or river segments or reaches.
16 Each instream flow reservation request was derived at a point on
17 the reach, generally near the downstream end of the reach. The
18 instream reservation will be measured and monitored at these points
19 on the reach or downstream from these points. (DFWP 72155-41A, Bd.
20 Exh. 37-A.1, pp. 1-90 and 1-91; DFWP Exh. 17, Spence Dir., pp. 9
21 and 10).

22 515. The stream or river segments are the lengths of streams
23 or rivers where fisheries, wildlife and recreational values warrant
24 protection (see application descriptions in DFWP 72155-41A, Bd.
25 Exh. 37-A.2 and Bd. Exh. 37-A.3; and, resource value descriptions
26 for each stream in the prefled direct testimony of DFWP
27 witnesses).

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1 516. When instream flows fall below the reservation flows at
2 the monitoring points, all junior users above these gauge sites
3 will be subject to restrictions whether they are on the reach
4 mainstem or its tributaries. (DFWP 72155-41A, Bd. Exh. 37-A.1, pp.
5 1-90 and 1-91; DFWP Exh. 17, Spence Dir., pp. 9 and 10).

6 517. The stream reach does not represent a stream segment
7 that has the same flow regime and instream flow requirement
8 throughout its length. The values of the stream reach will be
9 protected by monitoring the flows at or below the point where the
10 minimum flow needs were determined. (DFWP 72155-41A, Bd. Exh. 37-
11 A.1, p. 1-90; DFWP Exh. 17, Spence Dir., pp. 9 and 10).

12 518. The monitoring of instream flows at a downstream point
13 in the reach is a practical approach to protecting fisheries,
14 wildlife and recreational values within the reach. (Nelson
15 Redirect, Tr. Day 9, pp. 107, 108).

16 519. The effect of monitoring at a point in each reach will
17 be that the instream reservation could be adversely affected and
18 DFWP could, therefore, object to any new proposed junior users or
19 to changes in use above the monitoring point when the new uses or
20 change would result in the consumption of additional water
21 affecting the flows at the monitoring point. (DFWP 72155-41A, Bd.
22 Exh. 37-A.1, pp. 1-90 through 1-92; DFWP Exh. 17, Spence Dir., pp.
23 9 and 10).

24 520. DFWP would not be able to object to changes or new uses
25 occurring wholly within a reach, but above the monitoring point,
26 unless the change or new uses decreased the flow at the monitoring
27 point. A change in a point of diversion where the old and new
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1 points of diversion are above the monitoring point and the same
2 amount of water is consumed, would not adversely affect the
3 instream reservation. (DFWP 72155-41A, Bd. Exh. 37-A.1, pp. 1-90
4 through 1-92; DFWP Exh. 17, Spence Dir., pp. 9 and 10).

5 521. A change in use that decreases flows at the monitoring
6 point, such as a change in a point of diversion from the mainstem
7 to a diversion on a tributary reach where the monitoring point is
8 at the mouth of the tributary, could adversely affect an instream
9 reservation on the tributary. (DFWP 72155-41A, Bd. Exh. 37-A.1,
10 pp. 1-90 through 1-92; DFWP Exh. 17, Spence Dir., pp. 9 and 10).

11 522. From the time of establishment of instream reservations
12 in the Yellowstone basin in December 1978 through October 2, 1991,
13 the DNRC has issued 1,014 new water use permits and approved 499
14 changes in appropriation rights in the Yellowstone basin. DFWP
15 objected to 83 of the new permit applications and to only two
16 change applications. In most cases, DFWP did not request that the
17 new permits be denied or even changed, but that they be
18 specifically conditioned to recognize DFWP's senior instream flow
19 rights in the Yellowstone basin. (DFWP Exh. 17, Spence Dir., p.
20 7).

21 523. DFWP has objected at the rate of approximately 1 permit
22 in 20 and 1 change application in 100 on rivers that have Murphy
23 Rights. Murphy Rights are instream rights established in 1970 on
24 sections of 12 rivers, including, within the Missouri basin, Big
25 Spring Creek, the Gallatin River, the Madison River, the Missouri
26 River above Canyon Ferry and the Smith River. (DFWP Exh. 18,
27 Murphy Right Streams; Tr.-Day 8, Spence, pp. 62-63).
28

1 524. Since July 1, 1973 for Murphy Rights and since December
2 1978 for Yellowstone River basin reservations, DFWP has objected to
3 6 change-in-use applications based on Murphy Rights and 2 changes
4 based on Yellowstone River basin reservations. Six of the changes
5 were approved with one conditioned subject to a Murphy Right, one
6 change application was settled and one change application was
7 withdrawn by the applicant. There were other objectors to the
8 withdrawn application. (Tr.-Day 8, Spence, pp. 72-73 & 75).
9

10 F. FINDINGS OF NO ADVERSE AFFECT ON EXISTING WATER
11 RIGHTS [SECTION 85-2-316(9)(e), MCA; ARM 36.16.107B]

12 525. The instream reservations applied for by DFWP would not
13 remove or consume any water in a source of supply for an existing
14 water right use. (See generally the application by DFWP for
15 instream reservations, DFWP 72155-41a, Bd. Exhs. 37-A.1, 37-A.2 and
16 37-A.3).

17 526. The instream reservation requests of DFWP are intended
18 to preserve the present status quo against future additional
19 consumptive uses of water that would erode or further erode the
20 minimum instream flows needed for healthy fisheries. (DFWP 72155-
21 41a, Bd. Exh. 37-A.1, p. 1-90; DFWP Exh. 10, Graham Dir., p. 5 ;
22 DFWP Exh. 17, Spence Dir., p. 10; DFWP Exh. 46, Spence Reb., pp. 2
23 & 16).

24 527. The instream uses cannot adversely affect other instream
25 uses, such as instream uses for water quality or for downstream
26 nonconsumptive rights like hydropower generation. These rights
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1 would not compete against one another, but would be complementary
2 uses of the same water. (DFWP Exh. 10, Graham Dir., pp. 7 & 8).
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4 III. FINDINGS OF FACT: CITY OF BOZEMAN

5 528. The city of Bozeman is seeking a water reservation for a
6 proposed 6,000 acre-feet municipal storage reservoir to be
7 constructed upstream from Bozeman in the Gallatin National Forest
8 at about stream mile 13 of Sourdough creek, also known as Bozeman
9 creek. About 188 acres will be inundated by the proposed project.
10 The purpose is to meet the city's projected water supply shortfall
11 in the year 2025. (City of Bozeman 70188-41h, Bd. Exh. 4-A,
12 Application, pp. 2 through 4 and 26 through 28).

13 529. The city of Bozeman's present reliable firm water supply
14 is from 8,800 to 9,400 acre-feet per year. (City of Bozeman 70188-
15 41h, Bd. Exh. 4-A, Application, p. 15; Bd. Exh. 4-C, Final EA, pp.
16 4 and 5; and MTU/AFS Exh. 1, p. 23).

17 530. The ongoing expansion of Hyalite Reservoir, when
18 completed, will provide the city of Bozeman with an additional firm
19 supply of water, amounting to about 1,900-2,400 acre-feet annually.
20 (Ferris Cross, Tr. Day 1, p. 86; DFWP Exh. 101, Bd. Exh. 4-C, Final
21 EA, p. 5; Bd. Exh. 41, FEIS, p. 100; and MTU/AFS Exh. 1, p. 23).

22 531. The total firm water supply of the city of Bozeman,
23 including the water from the Hyalite Reservoir expansion, equals
24 about 10,700-11,800 acre-feet annually. (Bd. Exh. 4-C, Final EA,
25 p. 5; Bd. Exh. 41, FEIS, p. 100; and MTU/AFS Exh. 1, p. 23).

26 532. The population of Bozeman in 1990 was 22,660. From 1970
27 to 1990, Bozeman's population grew at an annual rate of
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1 approximately 1.0 percent. If this trend continues, the year 2025
2 would see a population of about 32,000. (Bd. Exh. 41, FEIS, pp. 98
3 and 99; Bd. Exh. 4-C, Final EA, pp. 7 and 8).

4 533. The city of Bozeman projected a population of 37,000 for
5 the city in the year 2025. A 1.2 percent annual growth rate was
6 assumed. (City of Bozeman 70118-41h, Bd. Exh. 4-A, (application)
7 pp. 10 and 11; Bd. Exh. 41, FEIS, p. 98, 99 and Table 3-6, p. 99).

8 534. According to an August 30, 1991 memo by Andy Epple,
9 planning director for the city of Bozeman, a realistic population
10 estimate for the city of Bozeman in the year 2025 is approximately
11 34,000. (DFWP Exh. 103).

12 535. The present average per capita daily water use for
13 Montana communities in the Missouri River basin is 200-250 gallons
14 per capita per day. (Bd. Exh. 4-C, Final EA, p. 5).

15 536. The city of Bozeman has accepted a per capita consumption
16 rate of 250 gallons per day when planning for its future water
17 needs. (City of Bozeman 70188-41h, Prehearing Memorandum dated
18 Jan. 20, 1992, p. 4; Tr. Day 1, Forbes Cross, p. 102).

19 537. Bozeman's present per capita water use of 344 gallons
20 per day is greater than most municipalities because of (1)
21 approximately 8 miles of streamside conveyance losses (losing about
22 1.4 cfs or 1,000 af annually); (2) overflows from the regulating
23 reservoirs; (3) unmanaged diversion gates on Bozeman and Hyalite
24 creeks during the winter; and (4) old leaky water mains. (Bd. Exh.
25 41, FEIS, pp. 99-100, Table 3-13).

26 538. Only 57 percent of the city's water diversions actually
27 are used by system customers. (Bd. Exh. 41, FEIS, p. 99).
28

1 539. The city of Bozeman reservation application did not
2 include water that will be supplied by the current enlargement of
3 Hyalite Reservoir, which is expected to provide an annual addition
4 of 2.9 cfs (2,097 acre-feet per year) of water to the city. (Bd.
5 Exh. 41, FEIS, p. 99-100, Table 3-13).

6 540. A projected population of 32,000 for the city of Bozeman
7 in the year 2025 will require, at 250 gallons per capita per day,
8 about 9,000 acre-feet of water annually. (Bd. Exh. 4-C, Final EA,
9 p. 5).

10 541. A projected population of 37,000 for the city of Bozeman
11 in the year 2025 will require, at 250 gallons per capita per day,
12 about 10,400 acre feet of water annually. A projected population
13 of 32,000 to 37,000 people in the year 2025 will require from 9,000
14 to 10,400 acre-feet of water annually. The current total firm
15 water supply of the city of Bozeman, including water from the
16 Hyalite Reservoir expansion, equals about 10,700 to 11,800 acre-
17 feet annually. Therefore, the city of Bozeman already controls
18 sufficient water to meet the needs of 37,000 people, as projected
19 in its reservation application. (Bd. Exh. 4-C, Final EA, p. 5).

20 542. The city of Bozeman has failed to demonstrate that under
21 present circumstances a 6,000 acre-feet storage reservoir is needed
22 on Sourdough Creek to satisfy the city's future water demand.
23 (Finding 540).

24 543. Sourdough Creek joins Rocky Creek at the city of Bozeman
25 to form the East Gallatin River. (DFWP 72155-41A, Bd. Exh. 37-A.2,
26 p. 2-539).

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1 544. The East Gallatin River has a history of water pollution
2 problems which continue today and periodically damage the river's
3 fishery resources. (DFWP 72155-41A, Bd. Exh. 37-A.2, pp. 2-569
4 through 2-574; Nelson Obj., DFWP Exh. 1, p. 2).

5 545. Headwater tributaries to the East Gallatin River, which
6 include Sourdough Creek, supply the water that is needed to dilute
7 urban pollutants that enter the East Gallatin River at Bozeman as
8 well as the effluent discharged at Bozeman's sewage treatment
9 facility. (DFWP 72155-41A, Bd. Exh. 37-A.2, p. 2-541; Nelson
10 Redir., Tr. Day 1, pp. 155 and 156).

11 546. DFWP, in its instream reservation application for
12 Sourdough Creek, requested that all remaining unappropriated water
13 remain instream to help provide the dilution flows that are needed
14 to help prevent the further deterioration of the water quality
15 component of fish habitat in the East Gallatin River. (DFWP 72155-
16 41A, Bd. Exh. 37-A.2, p. 2-541).

17 547. If the city of Bozeman's proposed 6,000 acre-feet storage
18 reservoir is constructed, Sourdough Creek's flow contribution to
19 the East Gallatin River will be substantially reduced. The city
20 could potentially remove up to 6,000 af/yr from Sourdough Creek.
21 This equals 32% of the annual streamflow in a normal water year and
22 55% during a drought year. This block of water would no longer be
23 available for dilution purposes in 11 miles of Sourdough Creek and
24 the 5.1 miles of the East Gallatin River upstream from the city's
25 sewage treatment plant. (Nelson Obj., DFWP Exh. 1, p. 3).

26 548. Portions of Sourdough Creek already suffer from periodic
27 dewatering. The city of Bozeman presently withdraws about 3,724
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1 acre-feet of water annually from Sourdough Creek. In addition,
2 water to irrigate about 2,287 acres is annually removed from the
3 Sourdough Creek drainage. (Nelson Obj., DFWP Exh. 1, pp. 3 and 4;
4 and city of Bozeman 70118-41H, Bd. Exh. 4-A, Application, pp. 15
5 and 17).

6 549. Flow releases from the city of Bozeman's proposed 6,000
7 acre-feet storage reservoir on Sourdough Creek would not benefit
8 instream flows and fisheries in Sourdough Creek. (Ferris Cross,
9 Tr. Day 1, pp. 91 and 92; Nelson Sur., DFWP Exh. 2, pp. 1 and 2;
10 Nelson Redir., Tr. Day 1, pp. 158 and 159).

11 550. Sourdough Creek supports a noteworthy small stream
12 fishery for rainbow, brook and brown trout that reside year-long in
13 the creek. Children are the primary users of the fishery. (Nelson
14 Obj., DFWP Exh. 1, p. 3; DFWP 72155-41A, Bd. Exh. 37-A.2, pp. 2-539
15 and 2-540).

16 551. The city of Bozeman has not shown a need for a
17 reservation that would have priority over an instream flow
18 reservation on Sourdough Creek under present circumstances.
19 (Findings 541-545).

20 552. A reservation granted to the city of Bozeman should be
21 conditioned as follows:

22 a. The city should be required to improve the efficiency
23 of its water system in order to attain a per capita consumption
24 rate of 250 gallons per day, which is about the average per capita
25 daily water use for Montana communities in the Missouri River
26 basin;

1 b. The city should be required to use all additional
2 water available to it from the enlarged Hyalite Reservoir prior to
3 diverting any additional water from Sourdough (Bozeman) Creek; and

4 c. The city should regulate flow releases from the
5 proposed reservoir to provide minimum fishery maintenance flows in
6 Sourdough Creek downstream from the city's diversion point.
7 (Findings 521, 536-539, 551).

8
9 **IV. FINDINGS OF FACT: CONSERVATION DISTRICTS
 AND BUREAU OF RECLAMATION PROJECTS**

10 A. Purpose [MCA §85-2-316(4)(a)(i); ARM 36.16.107B(1)]

11 553. Eighteen conservation districts organized under the
12 state conservation district act have made reservation applications
13 for 219 projects, primarily for new irrigation projects or to
14 provide supplemental water for existing irrigation. (Bd. Exh. 40,
15 DEIS, p. 248).

16 554. The Bureau of Reclamation (BUREC) is a federal agency,
17 which would reserve water for diversion from the Missouri River to
18 the Milk River for irrigation, municipal, and stock use, and for
19 the Lake Bowdoin National Wildlife Refuge. (Bd. Exh. 40, DEIS, p.
20 248).

21 555. The proposed uses of water to be reserved for the
22 conservation districts and BUREC are beneficial uses of water.
23 (Bd. Exh. 40, DEIS, p. 248).

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1 B. Need [MCA § 85-2-316(4)(a)(ii); ARM 36.16.107B(2)]

2 556. Reservations for the eighteen conservation districts and
3 BUREC would establish an early priority date of July 1, 1985, for
4 water to be used in the future. (Bd. Exh. 40, DEIS, p. 248).

5 557. If the conservation districts and BUREC do not receive
6 water reservations, they could still develop the proposed projects
7 through the water permitting process. (Bd. Exh. 40, DEIS, p. 248).

8 558. However, competing water users, including applicants who
9 have applied for other water reservations, could limit the amount
10 of water available for future appropriation. (Bd. Exh. 40, DEIS,
11 p. 248).

12

13 C. Amount [MCA § 85-2-316(4)(a)(iii); ARM 36.16.107B(3)]

14 559. The amounts of water requested by the 18 conservation
15 districts and BUREC are based on the requirements of individual
16 irrigation projects and other uses. (Bd. Exh. 40, DEIS, p. 250).

17 560. DFWP does not propose any additional Findings of Fact
18 concerning the amounts requested by the conservation districts for
19 the various projects. DFWP does not contest the amount requested
20 for each project.

21

22 D. Public Interest [MCA § 85-2-316(4)(a)(iv); ARM 36.16.107B(4)]

23 561. For the board to adopt an order reserving water, it must
24 find, in its judgment and discretion, that the reservation is in
25 the public interest, based on a weighing and balancing of the
26 following factors, making a specific finding for each factor.

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1 | (1) Benefit-Cost Factor [ARM 36.16.107B(4)(a)]

2 562. This factor requires a weighing of the benefits and
3 costs of each reservation application.

4 563. To be in the public interest, the expected benefits of
5 a reservation should be reasonably likely to exceed the costs.
6 Stated another way, the net benefits of a reservation must be
7 greater than zero. (DFWP Exh. 31, Duffield Dir., p. 4).

8 564. The benefit/cost test may be stated in a formula, as
9 follows:

0 Net Benefits = Direct Benefits +

1 Indirect Benefits - (Direct Costs + Indirect Costs).

2 (DFWP Exh. 31, Duffield Dir., p.4).

3 565. In general, the benefits and costs of irrigation
4 projects in this proceeding are as follows:

5	Direct Benefits:	Irrigation Crop Revenues
---	------------------	--------------------------

6	Direct Costs:	Irrigation System Capital,
7		Operations, Maintenance and Energy Costs

8	Indirect Costs:	<u>Foregone instream uses</u>
		Fish and Wildlife
9		Recreation
		Hydropower
0		Water quality

1 (Bd. Exh. 41, FEIS, pp. 35-39; DFWP Exh. 31, Duffield Dir., Att. 3)

566. All of the proposed irrigation projects conflict with instream uses, so that granting such projects will have indirect costs to instream uses. (Bd. Exh. 41, FEIS, p. 38; Bd. Exh. 40, DEIS, p. 255).

567. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but are

(1) General

1. The first part of the report is a general description of the project.
2. The second part is a description of the methods used.
3. The third part is a description of the results.
4. The fourth part is a discussion of the results.
5. The fifth part is a conclusion.
6. The sixth part is a list of references.
7. The seventh part is a list of figures.
8. The eighth part is a list of tables.
9. The ninth part is a list of appendices.
10. The tenth part is a list of footnotes.
11. The eleventh part is a list of symbols.
12. The twelfth part is a list of abbreviations.
13. The thirteenth part is a list of acronyms.
14. The fourteenth part is a list of definitions.
15. The fifteenth part is a list of units.
16. The sixteenth part is a list of formulas.
17. The seventeenth part is a list of equations.
18. The eighteenth part is a list of diagrams.
19. The nineteenth part is a list of photographs.
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1 substantial. (Bd. Exh. 41, FEIS, p. 35; DFWP Exh. 31, Duffield
2 Dir., pp. 15-16). The remaining elements of the benefit/cost
3 formula have been quantified. (DFWP Exh. 31, Duffield Dir.,
4 Attach. D).

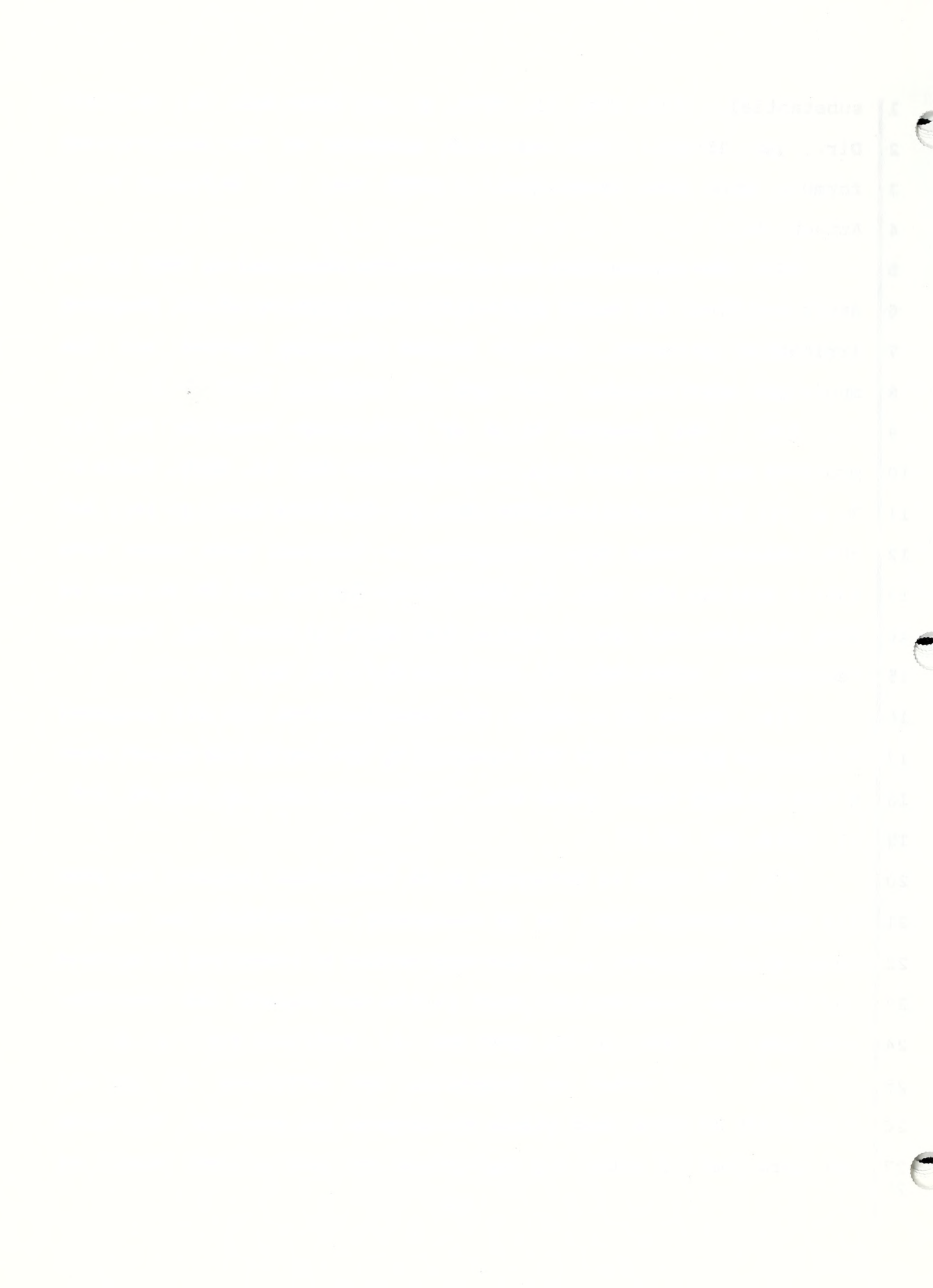
5 568. The Consumptive Use alternative described by DNRC in the
6 draft and final EIS would provide for the granting of all proposed
7 irrigation projects, with a second priority behind all the
8 municipal applications. (Bd. Exh. 41, FEIS, p. S-2).

9 569. The present value of irrigation benefits for all
10 projects may range from \$132.1 million (Bd. Exh. 41, FEIS, Table 2-
11 3, p. 36) to \$144 million (DFWP Exh. 31, Duffield Dir., p. 14), but
12 the indirect costs from irrigation to instream uses range from
13 \$304.6 million (Bd. Exh. 41, FEIS, Table 2-3, p. 36) to as high as
14 \$372 million for power costs and \$103 million for foregone
15 recreation. (DFWP Exh. 31, Duffield Dir., p. 15).

16 570. Taken as a whole, the benefits from all 219 proposed
17 irrigation projects are far exceeded by the costs and do not pass
18 a benefit/cost test. (DFWP Exh. 31, Duffield Dir., p. 15; Bd. Exh.
19 41, FEIS, pp. 36-37).

20 571. In order to determine which individual projects may pass
21 the benefit/cost test, it is necessary to identify the set of
22 reservation requests, i.e., the combination of competing irrigation
23 and instream reservations, that yields the highest net benefits.
24 (Bd. Exh. 41, FEIS, p. 38; DFWP Exh. 31, Duffield Dir., p. 6).

25 572. In order to determine the efficient or optimal
26 allocation of water that yields the highest net benefits, the value
27 per acre-foot of water for irrigation for each project should be
28



1 compared to the value of that water for instream uses, which
2 include hydropower generation, fish and wildlife, recreation and
3 water quality. The use with the highest value passes the
4 benefit/cost test. (Bd. Exh. 41, FEIS, p. 38; DFWP Exh. 31,
5 Duffield Dir., p. 6).

6 573. The value of water for irrigation was determined by
7 DNRC, based on a detailed analysis of each project. (Bd. Exh. 41,
8 FEIS, p. 35). For each project, DNRC estimated net present values
9 for 300 scenarios, accounting for variability in future crop
10 prices, production costs and crop yields for each proposed project.
11 (Bd. Exh. 41, FEIS, p. 35). The irrigation benefits for each
12 project are the median value today of 70 years of returns, less
13 costs. (Bd. Exh. 41, FEIS, p. 35; DFWP Exh. 31, Duffield Dir., p.
14 10).

15 574. Several assumptions which are favorable to irrigation
16 were made by DNRC in determining the value of water for the
17 proposed projects. (Tr. Day 3, Tubbs Cross, p. 247).

18 575. DNRC assumed that the most profitable crop, alfalfa,
19 would be grown on all the acres to be developed, although DNRC's
20 surveys indicated farmers would grow alfalfa on only 65% of the
21 lands to be irrigated. (Tr. Day 3, Tubbs Cross, p. 260)

22 576. DNRC assumed the highest attainable yields would be
23 obtained, based on the assumption that each farmer would have an
24 incentive to use the best management practices. (Tr. Day 3, Tubbs
25 Cross, p. 252).

1 577. DNRC assumed water would be available at least eight
2 years out of ten, which is considered the minimum necessary for a
3 profitable irrigation operation. (Tr. Day 3, Tubbs Cross, p. 254).

4 578. DNRC assumed that alfalfa prices would not be depressed
5 on account of an additional 150,000 acres of irrigated alfalfa
6 production. (Tr. Day 3, Tubbs Cross, p. 253).

7 579. Projections are that alfalfa needs will decrease by more
8 than 40% over the next 50 years. (Bd. Exh. 41, FEIS, p. 83).

9 580. As a result of the foregoing assumptions made in
10 computing direct benefits to be derived from irrigation, the
11 irrigation values of water are high.

12 581. The consumptive use values of water for irrigation must
13 also take into account appropriate assumptions concerning the
14 amount of water diverted that will return to the source. (Bd. Exh.
15 41, FEIS, p. 38 and App. B.).

16 582. DNRC initially assumed a 50% return flow from irrigation
17 to the source in calculating irrigation benefits. (DFWP Exh. 31,
18 Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3).

19 583. This assumption is not valid for this proceeding, as it
20 would overestimate the value of projects using efficient sprinkler
21 systems and underestimate the value of flood irrigation projects.
22 (Bd. Exh. 41, FEIS, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh.
23 31, Duffield Dir., p. 11).

24 584. Estimates of water consumed by each project derived by
25 DNRC's Missouri River water availability model provide the most
26 reasonable estimates of water consumed and return flows. (Bd. Exh.
27 41, FEIS, p. 38; MPC Exh. 4, Bucher Dir., p. 3).
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1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the problem and the objectives of the research. The second part of the report is a detailed description of the methods used in the study. This includes a description of the experimental design, the subjects, the materials, and the procedures. The third part of the report is a presentation of the results of the study. This includes a description of the data collected and the statistical analysis of the data. The fourth part of the report is a discussion of the results and their implications. This includes a comparison of the results with previous research and a discussion of the limitations of the study. The fifth part of the report is a conclusion and a list of references.

1 585. The model considers crop water requirements and
2 irrigation efficiencies for each project. In addition, no return
3 flows are assumed for 65 proposed irrigation projects located on
4 higher benchlands. (Bd. Exh. 41, FEIS, p. 38; MPC Exh. 4, Bucher
5 Dir., pp 8-9; DFWP Exh. 31, Duffield Dir., p. 11).

6 586. Recreation values per acre-foot of water are as follows:

7 Subbasin	July-August	Rest of Year

8 Headwaters	\$35.40	\$8.23
9 Upper Missouri	\$19.46	\$4.76
10 Marias/Teton	\$ 5.81	\$1.63
11 Middle Missouri	\$ 5.81	\$1.63

12 (Bd. Exh. 41, FEIS, p. 38).

13 587. Nonmarket valuation methods must be used to value water
14 for recreation. (DFWP Exh. 31, Duffield Dir., p. 29).

15 588. Such values were derived using the Contingent Valuation
16 Method (CVM) of valuing nonmarket goods. (Bd. Exh. 41, FEIS, p.
17 92; DFWP Exh. 31, Duffield Dir., p. 32).

18 589. The scope and design of the Missouri River basin
19 recreation survey and economic study produced valid estimates of
20 the values of instream flows for recreation. (Bd. Exh. 41, FEIS,
21 p. 92; DFWP Exh. 31, Duffield Dir., p. 34).

22 590. The CVM is widely recognized as an appropriate
23 methodology, and is contained in the U.S. Water Resources Council's
24 Economic and Environmental Principles and Guidelines for Water and
25 Related Land Resources Implementation Guides (1983). (Bd. Exh. 41,
26 FEIS, p. 92; DFWP Exh. 31, Duffield Dir., p. 31).

591. Eight thousand Montanans and 1000 nonresidents were randomly surveyed for the CVM study. Appropriate survey techniques were used to limit possible biases in responses. (Bd. Exh. 41, FEIS, p. 92; DFWP Exh. 34, p. 15; Tr. Day 10, Duffield Redirect, p. 238).

592. The sample size and methods used are appropriate to the information needs and are consistent with accepted professional practice. (Bd. Exh. 41, FEIS, p. 92; DFWP Exh. 34, p. 3; Tr. Day 10, Duffield Redirect, p. 238).

593. The hydropower values per acre-foot of water in the Missouri River basin are as follows:

Subbasin/dams	Value @ 50 mills	Value @ 75 mills	Value @ 100 mills
Headwaters Subbasin above Toston	\$58.91	\$88.37	\$117.83
Upper Missouri Subbasin			
Toston Dam to Canyon Ferry Dam	\$56.88	\$65.32	\$113.76
Canyon Ferry Dam to Hauser Dam	\$51.81	\$77.71	\$103.61
Hauser Dam to Holter Dam	\$49.98	\$74.97	\$ 99.96
Holter Dam to Morony Dam	\$46.02	\$69.04	\$ 92.05
Marias/Teton Subbasin and Middle Missouri Subbasin			
Morony Dam to Fort Peck Dam	\$33.36	\$50.04	\$66.72

(Bd. Exh. 41, FEIS, p. 39)

The 75 mill values in the above table were derived by a simple interpolation between the 50 mill and 100 mill values.

594. Seventy-five mills is an appropriate value for replacement cost of power. (DFWP Exh. 31, Duffield Dir., p. 17; MPC Exh. 2, Stauffer Dir., p. 3).

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595. At a 75 mill value for power, the following projects have net benefits greater than the indirect costs to instream uses per acre-foot of water for recreation and hydropower:

<u>Project No.</u>	<u>Consumptive Value(-)</u>	<u>Instream Value (=)</u>	<u>Net Benefit</u>
GA-201	\$157.25	\$110.19	\$47.06
TE-321	\$ 90.17	\$ 53.76	\$36.41
TE-361	\$ 83.52	\$ 53.76	\$29.76
CHI-61	\$ 89.10	\$ 53.76	\$35.34
TE-591	\$ 85.84	\$ 53.76	\$32.08
TE-101	\$ 75.52	\$ 53.76	\$21.76
TE-581	\$ 66.44	\$ 53.76	\$12.38
TEI-40	\$ 63.48	\$ 53.76	\$ 9.72
CHI-80	\$ 65.78	\$ 53.76	\$12.02
CHI-72	\$ 62.03	\$ 53.76	\$ 8.27
CHI-74	\$ 56.52	\$ 53.76	\$ 2.76

(Bd. Exh. 41, FEIS, pp 38-39; Appendix B)

596. The instream costs from the above projects do not take into account the cumulative losses to recreation downstream from the diversion points, but count recreation losses only in the subbasin where the diversion occurs. Water diverted from a stream high in the basin would have flowed through many recreation facilities, all the way down the river. (DFWP Exh. 31, Duffield Dir., p. 9).

597. The above consumptive values assume power costs to the irrigator of 50 mills. (Bd. Exh. 41, FEIS, App. B).

598. The remaining 209 projects which include BUREC's Virgelle project, have values less than the instream values for recreation and hydropower and do not pass the benefit/cost test. (Bd. Exh. 41, FEIS, App. B).

599. Project GA-201 would divert arsenic-laden water from the Madison River and use the water for irrigation in a seed potato operation. (Bd. Exh. 23-C, Final EA, Gallatin CD, p. 1).

1 600. The irrigated lands for proposed project GA-201 are
2 benchlands in the Gallatin River drainage. (Bd. Exh. 23-C, Final
3 EA, Gallatin CD, p. 1).

4 601. The Gallatin River drainage does not presently have an
5 arsenic problem. (Bd. Exh. 40, DEIS, p. 186).

6 602. Irrigation return flows from Project GA-201 would
7 eventually contaminate aquifers in the lower Gallatin River basin.
8 (Bd. Exh. 23-C, Final EA, Gallatin CD, p. 22).

9 603. Project GA-201 would also cause thermal pollution in the
10 Madison River at and below the point of diversion by elevating the
11 water temperature. (Final EA, Gallatin CD, p. 23; DFWP Exh. 3,
12 Nelson Obj., p. 3; Tr. Day 4, Nelson Cross, p. 13).

13 604. This portion of the Madison River already suffers from
14 abnormally elevated water temperatures in the summer. (DFWP Exh.
15 3, Nelson Obj., p. 5; Tr. Day 4, Nelson Cross, p. 13).

16 605. Heat-related fish kills have recently occurred in the
17 lower Madison River. (DFWP Exh. 3, Nelson Obj., p. 2).

18 606. Additional flow depletions caused by GA-201 will
19 aggravate the present thermal problem and will likely cause massive
20 fish kills. (DFWP Exh. 3, Nelson Obj., p. 2; Bd. Exh. 40, DEIS, p.
21 204; Bd. Exh. 23-C, Final EA, Gallatin CD, p. 23).

22 607. The unquantified water quality costs from Project GA-201
23 caused by transporting arsenic-laden water out of the Madison basin
24 and into the Gallatin basin and by increasing thermal pollution in
25 the Madison River should be considered along with the quantified
26 costs to instream uses.

1 608. For Project GA-201, the quantified and unquantified
2 costs to instream uses incurred by hydropower, recreation, water
3 quality and fish and wildlife exceed the irrigation benefits.

4 609. The other 10 projects which initially pass the
5 benefit/cost test (TE-321, TE-361, CHI-61, TE-591, TE-101, TE-581,
6 TEI-40, CHI-80, CHI-72 and CHI-74) are in the Teton River basin.
7 (Bd. Exh. 41, FEIS, pp. 4,6). Although they pass the benefit/cost
8 test, they would have severe adverse impacts on flows in the Teton
9 River, with consequential adverse impacts on aquatic life and
10 senior water rights. (Findings 610-612, 686-693).

11 610. These projects would reduce Teton River flows
12 substantially, and more frequently to zero, causing water
13 temperatures to rise and dissolved oxygen to drop to the point
14 where aquatic life would be harmed. (Bd. Exh. 40, DEIS, p. 187;
15 Bd. Exh. 33-C, Final EA, Teton County CD, p. 17).

16 611. There is little water legally available in the Teton
17 River for new consumptive appropriations, and new permit
18 applications are not encouraged. (Bd. Exh. 33-C, Final EA, Teton
19 County CD, p. 12).

20 612. New consumption of water in the Teton River basin will
21 cause water quality problems for water users in the lower reaches
22 of the Teton River. Adverse effects on existing water right
23 holders are likely to occur. (Great Falls Public Hearing, Tr. pp.
24 13, 14, 25-26, 29; Tr. Day 14, Horpestad Redirect, p. 104).

25 613. Based on the foregoing factors, the quantified and
26 unquantified costs of granting projects in the Teton basin exceed
27 the benefits and granting the applications for Projects TE-321, TE-
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361, CHI-61, TE-591, TE-101, TE-581, TEI-40, CHI-80, CHI-72 and CHI-74 is not in the public interest.

(2) Net Benefits of Reservation Greater Than Net Benefits of Not Granting the Reservation [ARM 36.16.107B(4)(b)]

614. By definition, "net benefits" mean indirect and direct benefits less indirect and direct costs. Indirect costs include economic opportunity costs that the requested flow reservation may have to parties other than the reservant. [ARM 36.16.107B(4)(b)]. Thus, this factor is similar to the benefit/cost criteria upon which findings of fact have been made above. The net benefits of not granting each irrigation project would be greater than granting the irrigation projects. (Bd. Exh. 41, FEIS, p. 39 and App. B; Findings 608, 612).

(3) Reasonable Alternatives with Greater Net Benefits [ARM 36.16.107B(4)(c)]

615. Granting instream flow reservations in all reaches requested, not granting the projects identified in Findings of Fact Nos. 608, 613, and 766, and granting instream flow reservations priority over the irrigation projects identified in Findings of Fact Nos. 764-765, results in the greatest net benefits to society. (Bd. Exh. 41, FEIS, p. 39 and App. B).

(4) Irretrievable Loss of Resource Development Opportunity [ARM 36.16.107B(4)(d)]

616. If the conservation district's or BUREC's reservation requests are not approved, the applicants may still apply for water permits. (Bd. Exh. 40, DEIS, p. 248).

1 301, CHI-61, 78-551, 78-551

2 CHI-74 is not in the public domain

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1 617. Reservations of water for instream use may preclude
2 future consumptive uses of water. (Bd. Exh. 40, DEIS, p. 243).

3 618. However, water reserved for instream use is not
4 permanently unavailable for other uses. (Bd. Exh. 40, DEIS, p.
5 243).

6 619. There can be no actual loss of a resource development
7 opportunity unless the proposed project is economically feasible
8 and has benefits greater than the costs to other uses. (DFWP Exh.
9 31, Duffield Dir., p. 13).

10 620. In this proceeding, the net benefits from the proposed
11 projects have been weighed against the costs to instream uses and
12 other interests and the economic feasibility of each project
13 determined.

14 621. There will be no irretrievable loss of a resource
15 development opportunity if the proposed irrigation projects are not
16 granted, except for the projects identified in Finding of Fact No.
17 765 and 766 with a priority behind instream reservations.

18 (5) Public Health, Welfare and Safety Impacts [ARM
19 36.16.107B(4)(e)]

20 622. Many of the proposed irrigation projects would have
21 significant adverse impacts to public health, safety and welfare.
22 (Bd. Exh. 40, DEIS, pp. 153-236; Bd. Exh. 41, FEIS, pp. S-3 to S-
23 6).

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1. The Commission of the European Communities (CEC) has
2. the honor to acknowledge the receipt of your letter of 14th
3. June 1973, in which you requested information on the
4. Commission's activities in the field of research and
5. development in the area of the environment.
6. The Commission has been studying your request and
7. is pleased to inform you that it has been decided to
8. send you a copy of the Commission's report on the
9. state of the environment in the Community, which
10. was published in 1972.
11. The report is available in English, French, German,
12. Italian, and Dutch. It contains a detailed description
13. of the Commission's work in the field of the
14. environment, and also a list of the Commission's
15. publications on the subject.
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24. publications on the subject.
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26. it has been decided to send you a copy of the
27. Commission's report on the state of the environment
28. in the Community, which was published in 1972.

1 (a) Water Quantity/Aquatic Habitat

2 General

3 623. Many streams in the Missouri River basin where water
4 reservation requests have been made already suffer from low flow
5 condition and would be further dewatered by irrigation projects
6 developed through the use of reservations. (Bd. Exh. 40, DEIS, pp.
7 45-54; Bd. Exh. 41, FEIS, p. S-3). These streams are shown in
8 Table 4.

9 624. In the headwaters sub-basin, streamflows ranging from
10 extremely low to zero have been observed on several stream reaches,
11 notably the Jefferson River near the mouth and for a stretch below
12 the Waterloo Bridge south of Whitehall, and on the Gallatin River
13 near the confluence with the East Gallatin River. (Bd. Exh 40
14 DEIS, p. 45).

15 625. In the upper Missouri sub-basin, irrigation causes most
16 of the seasonal low flow conditions. Low flow conditions are
17 common in the Sun River below the Diversion Dam that feeds Pishkun
18 Canal and this condition persists throughout the summer as long as
19 irrigation diversions are occurring. Flows in the middle and lower
20 sections of the Smith River can also be seriously reduced in the
21 late summer due to irrigation diversions. Natural low flow
22 conditions occur in portions of Belt Creek for about 13 miles below
23 Otter Creek where only intermittent flows occur during dry years.
24 Irrigation and natural conditions cause severe low flow conditions
25 in portions of Dry Creek, Confederate Gulch and Avalanche Creek on
26 the east side of the Missouri River and Canyon Ferry Reservoir.
27 (Bd. Exh. 40, DEIS, pp. 49 and 51).
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Table 4

Table 4-4. Upper Missouri Subbasin—low flow problem areas

Stream-Tributary	Stream Reaches	Cause
Missouri River (Three Forks to Canyon Ferry)	Headwaters at Three Forks to Canyon Ferry Reservoir	Irrigation
Avalanche Creek	Cooney Gulch to Canyon Ferry Reservoir	Irrigation, Natural
Beaver Creek	Headwaters to Canyon Ferry Reservoir	Irrigation
Confederate Gulch	Debauch Gulch to mouth	Irrigation, Natural
Crow Creek	Tizer & Wilson Creeks to Williams Ditch intake	Irrigation
Deep Creek	Castle Fork to Missouri River	Irrigation
Dry Creek	Headwaters to Broadway Missouri Canal	Irrigation, Natural
Duck Creek	Headwaters to Canyon Ferry Reservoir	Irrigation
Sixteenmile Creek	Billy Creek to mouth	Irrigation
Smith River	Portions of creek	Irrigation
Butte Creek	Portions of creek	Irrigation
Camas Creek	Portions of creek	Irrigation
Eagle Creek	Portions of creek	Irrigation
Hound Creek	Portions of creek	Irrigation
Newlan Creek	Portions of creek	Irrigation
N. Fork Smith River	Portions of creek	Irrigation
Sheep Creek	Portions of creek	Irrigation
Spring Creek	Portions of creek	Irrigation
Thomas Creek	Portions of creek	Irrigation
Missouri River (Canyon Ferry to Holter Dam)		
Spokane Creek	Helena Valley Canal to mouth	Natural, Irrigation
Trout Creek	Vigilante Campground to mouth	Irrigation
Prickly Pear Creek	East Helena Highway Bridge to Lake Helena	Irrigation
Tenmile Creek	Portions of creek	Irrigation
Silver Creek	Helena Valley Canal to mouth	Irrigation
Canyon Creek	Portions of creek	Irrigation
Little Prickly Pear	Headwaters to 5.5 miles downstream	Irrigation
Little Prickly Pear	Clark Creek to mouth	Irrigation
Wegner Creek	Portions of creek	Natural
Stickney Creek	North and South Forks to mouth	Natural
Sevenmile Creek	Headwaters to Tenmile Creek	Irrigation
Dearborn River	Portions of creek	Irrigation
South Fork Dearborn	Portions of creek	Irrigation
Sun River	Diversion dam to mouth	Irrigation
Big Muddy Creek	Portions of creek	Irrigation
Willow Creek	Portions of creek	Irrigation
Elk Creek	Portions of creek	Irrigation
Mill Coulee	Portions of creek	Irrigation
Ford Creek	Portions of creek	Irrigation
Smith Creek	Portions of creek	Irrigation
Belt Creek	Big Otter Creek to Missouri	Natural
Little Belt Creek	Portions of creek	Natural
Big Otter Creek	Portions of creek	Natural

Table 4 (continued)

Table 4-2. Headwaters Subbasin—low-flow problem areas

Stream/tributary	Stream reaches where low flow occurs	Cause of low flows
Beaverhead River	<i>Clark Canyon</i> East Bench Diversion Dam to Mouth	Reservoir , Irrigation
Poindexter Slough	Portions of slough	Irrigation
Spring Creek	Portions of creek	Irrigation
Rattlesnake Creek	Portions of creek	Irrigation
Big Sheep Creek	Cabin and Nicholls creeks to mouth	Irrigation
Blacktail Deer Creek	Middle Fork and West Fork to county road	Irrigation
Browns Canyon Creek	Portions of creek	Irrigation
Grasshopper Creek	Blue Creek to mouth	Irrigation
Horse Prairie Creek	Headwaters to mouth	Irrigation
Long Creek	Jones Creek to mouth	Irrigation
Medicine Lodge Creek	Bear Canyon to mouth	Irrigation
Big Hole River	Portions of river	Irrigation
Birch Creek	Mule Creek to mouth	Irrigation
Deep Creek	Sevenmile Creek to mouth	Irrigation
Jerry Creek	Portions of creek	Irrigation
Moose Creek	Portions of creek	Irrigation
Wise River	Mono & Jacobsen creeks to mouth	Irrigation
Willow Creek	Portions of creek	Irrigation
Trapper Creek	Portions of creek	Irrigation
Camp Creek	Portions of creek	Irrigation
Steel Creek	Portions of creek	Irrigation
Moose Creek	Portions of creek	Irrigation
East Gallatin River	Near confluence with Gallatin River	Irrigation
Thompson Springs Creek	Portions of creek	Irrigation
Ross Creek	Portions of creek	Natural
Reese Creek	Portions of creek	Irrigation
Dry Creek	Portions of creek	Irrigation
Baker Creek	Lane bridge to mouth	Irrigation
Bridger Creek	Headwaters to mouth	Irrigation
Hyalite Creek	Middle Creek ditch to I-90 bridge	Irrigation
South Cottonwood Creek	Jim Creek to Hart Ditch headgate	Irrigation
Sourdough Creek	Portions of creek	Irrigation
Smith Creek	Portions of creek	Irrigation
Camp Creek	Portions of creek	Irrigation
Big Bear Creek	Below forest boundary	Irrigation
Gallatin River	<i>Shadys Bridge</i> West Fork and East Gallatin River to mouth	Irrigation
Jefferson River	Portions of river—Waterloo Bridge to Three Forks	Irrigation, Natural
Boulder River	West Fork and South Fork to mouth	Irrigation
Little Boulder River	Moose Creek to mouth	Irrigation
East Boulder River	Portions of river	Irrigation
South Boulder River	Portions of river	Irrigation
Dry Boulder Creek	Portions of creek	Irrigation
North Willow Creek	Hollow Top Lake to mouth	Irrigation
South Willow Creek	Granite Lake to mouth	Irrigation
Whitetail Creek	Whitetail Reservoir to mouth	Irrigation
Cherry Creek	Portions of creek	Irrigation
Fish Creek	Portions of creek	Irrigation
Dry Creek	Portions of creek	Irrigation
Big Pipestone Creek	Portions of creek	Irrigation
Madison River	Hebgen Dam to West Fork <i>Snake Lake</i>	Reservoir
Ruby Creek	Lower portion	Irrigation
Indian Creek	Lower portion	Irrigation
Blaine Springs Creek	Ennis Fish Hatchery to mouth	Irrigation
Jack Creek	Lone Creek to mouth	Irrigation
Hot Springs Creek	North and Middle Forks to mouth	Irrigation
Cherry Creek	Lower 4.5 miles	Irrigation
North Meadow Creek	Portions of creek	Irrigation
Red Canyon Creek	Portions of creek	Natural
Red Rock River	Lima Dam to Clark Canyon Reservoir	Reservoir, Irrigation
Big Sheep Creek	Portions of creek <i>Canyon to mouth</i>	Irrigation
Odeil Creek	Portions of creek	Irrigation
Sage Creek	Portions of creek	Irrigation
Long Creek	Portions of creek <i>Jones Creek to mouth</i>	Irrigation
Little Sheep Creek	Portions of creek	Irrigation
Ruby River	Ruby Reservoir to mouth	Irrigation
Wisconsin Creek	Portions of creek	Irrigation
Mill Creek	Portions of creek	Irrigation
Alder Gulch	Portions of creek	Irrigation
Sweetwater Creek	Portions of creek	Irrigation
Indian Creek	Portions of creek	Irrigation

Table 4 (continued)

Table 4-6. Marlas/Teton Subbasin—low-flow problem areas

Stream/tributary	Stream reaches where low flows occur	Cause of low flows
Marlas River	Portions of river	Irrigation
Cut Bank Creek	Portions of creek	Irrigation
Dupuyer Creek	Portions of creek	Irrigation
North Fork Dupuyer Creek	To Dupuyer Creek	Irrigation
South Fork Dupuyer Creek	To Dupuyer Creek	Irrigation
North Fork Willow Creek	To Willow Creek	Irrigation
South Fork Willow Creek	To Willow Creek	Irrigation
Birch Creek	Portions of creek below diversions	Irrigation
Teton River	Below Priest Butte Lake	Irrigation
Deep Creek	Portions of creek	Irrigation
North Fork Deep Creek	To Deep Creek	Irrigation
South Fork Deep Creek	To Deep Creek	Irrigation
Willow Creek	To Deep Creek	Irrigation
McDonald Creek	To Teton River	Irrigation
Spring Creek	Portions of creek	Irrigation

Table 4-8. Middle Missouri Subbasin—low-flow problem areas

Stream/tributary	Stream reaches where low flows occur	Cause of low flows
Judith River	South Fork and North Fork to Big Springs Creek	Irrigation
South Fork Judith River	Portions of creek	Natural
Louse Creek	Portions of creek	Irrigation
McCarthy Creek	Portions of creek	Irrigation
Cottonwood Creek	Portions of creek	Natural
Musselshell River	Deadmans Basin diversion to Musselshell diversion	Irrigation
South Fork Musselshell River	Headwaters to North Fork and below diversion	Irrigation
Cottonwood Creek	Loco Creek to mouth	Irrigation
Checkerboard Creek	East and West forks to mouth	Irrigation
Spring Creek	Portions of creek	Natural
Big Elk Creek	Lebo Fork origin to mouth	Irrigation
American Fork Creek	South Fork to mouth	Natural
Careless Creek	Headwaters to Roberts Creek	Irrigation
Swimming Woman Creek	Headwaters to 8 miles above mouth	Irrigation
Collar Gulch	Portions of creek	Irrigation
Flagstaff Creek	Portions of creek	Irrigation

1 626. In the Marias/Teton sub-basin, low flow conditions occur
2 on some small tributary streams in the Marias and Teton basins.
3 July flows at the mouth of the Teton River near Loma cease during
4 the driest two years in ten. Flows cease in August and September
5 of average years. (Bd. Exh. 40, DEIS, pp. 52 and 166).

6 627. In the middle Missouri sub-basin, low flow conditions
7 occur for several miles in an upper reach of the Judith River due
8 to locally intensive irrigation. Low flow conditions are also
9 found in the Musselshell River downstream from Deadmans Basin
10 diversion and between Melstone and Mosby. These low flow
11 conditions are caused largely by canal diversions for irrigation.
12 (Bd. Exh. 40, DEIS, p. 54).

13 628. Reduced streamflow can decrease the habitat available to
14 fish and aquatic organisms eaten by fish, resulting in lower
15 numbers and weight of fish in a stream. (Bd. Exh. 40, DEIS, p.
16 201).

17 629. Several recent examples illustrate where low flows have
18 affected fish populations. On the Musselshell River, the 1985
19 drought reduced brown trout populations by one-half near the
20 Selkirk Fishing Access Site. Younger fish declined 72-93%. Fish
21 populations in the Musselshell River below the Deadmans Basin
22 diversion are about one-third of those found above the diversion
23 which diverts a large portion of the Musselshell River into
24 Deadmans Basin Reservoir. Following an increase in size and
25 numbers of rainbow trout in the Big Hole River between 1986 and
26 1987, these populations decreased during the 1988 drought,
27 primarily affecting younger fish. The number and weight of brown
28

1 trout larger than 18 inches in the Beaverhead River below Clark
2 Canyon Dam has decreased as winter releases have been severely
3 reduced during recent drought periods. (Bd. Exh. 40, DEIS, p.
4 202).

5 630. Generally, impacts of reduced streamflows due to
6 additional water withdrawals would be noticed most on streams where
7 flows are sometimes so low that aquatic habitat is already being
8 adversely affected. In some instances, additional depletions would
9 reduce flows to zero. (Bd. Exh. 40, DEIS, p. 202).

10 Gallatin River Sub-basin

11 631. The sources of supply for projects GA-13, GA-14, GA-24,
12 GA-35, GA-40, GA-41, GA-44, GA-46, GA-79, GA-81, GA-92, GA-110, GA-
13 124, GA-130, GA-143, and GA-151 are wells which would pump water
14 from aquifers in the Gallatin River basin. (Bd. Exh. 23-C, Final
15 EA, Gallatin CD, pp. 6-8).

16 632. Groundwater withdrawals for these projects will result
17 in equivalent depletions from surface waters. (MPC Exh. 4, Bucher
18 Dir., p. 9).

19 633. The groundwater withdrawal for these projects will
20 deplete flows in the East Gallatin River by 19 cfs in August (from
21 an average of 49 cfs down to 30 cfs). (Bd. Exh. 23-C, Final EA,
22 Gallatin CD, p. 13).

23 634. Further flow reductions in the East Gallatin River would
24 worsen an already undesirable situation for aquatic habitat and
25 result in a moderate-to-major adverse impact. (Bd. Exh. 23-C,
26 Final EA, Gallatin CD, p. 23).

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Jefferson River Sub-basin

635. The Jefferson River is the proposed source of supply for the following projects: BR-52, BR-101, JV-25, JV-55, JV-95, JV-201, JV-202, JV-203, JV-204, and GA-102. (Bd. Exh. 41, FEIS, p. 5; DFWP Exh. 3, Nelson Obj., p. 11).

636. These projects would divert a total of 309.64 cfs from the Jefferson River. (DFWP Exh. 3, Nelson Obj., p. 15).

637. Taking into account return flows, July flows would be reduced by 228 cfs. (DFWP Exh. 3, Nelson Obj., p. 15).

638. Summer flows in the Jefferson River near Waterloo and at the mouth are already low or nonexistent in some years. (Bd. Exh. 40, DEIS, p. 158; Bd. Exh. 27-C, Final EA, Jefferson Valley CD, p. 8).

639. Development of these projects would cause the flow to cease in the Jefferson River during the driest two out of ten years in August, and the driest one year in ten in July. (Bd. Exh. 40, DEIS, p. 158). During a normal flow year (50th percentile), August flows would decrease 22 percent. (DFWP Exh. 3, Nelson Obj., p. 15). In wet years, August flows would decline 18.4 percent. (Bd. Exh. 40, DEIS, p. 158).

640. Water would be available only 2 years out of 10 for projects JV-201, JV, 202, JV-204 and JV-95. (Bd. Exh. 27-C, Final EA, Jefferson Valley CD, p. 8).

641. The Jefferson River has significant fisheries resources which are already depressed by existing low flow conditions, and which would be severely impacted by the proposed irrigation

1 projects. (DFWP Exh. 3, Nelson Obj., p. 17; Tr. Day 4, Nelson
2 Cross, pp. 51 and 56; Tr. Day 5, Roos Cross, p. 63, 65).

3 642. The Jefferson River receives significant recreational
4 use, which would be severely impacted by further depletions. (Tr.
5 Day 4, Nelson Cross, p. 51).

6
7 Boulder River Sub-basin

8 643. The source of supply for Projects JV-17, JV-18, JV-63,
9 JV-80 and JV-81 are wells adjacent to the Boulder River. (Bd. Exh.
10 27-C, Final EA, Jefferson Valley CD, p. 4).

11 644. Because of their proximity to the Boulder River, flows
12 in the river would be substantially reduced. (Bd. Exh. 27-C, Final
13 EA, Jefferson Valley CD, p. 15; MPC Exh. 4, Bucher Dir., pp. 10-11;
14 DFWP Exh. 3, Nelson Obj., p. 9).

15 645. The mid-segment of the Boulder River where these
16 proposed projects are located has an existing low-flow problem.
17 (Bd. Exh. 27-C, Final EA, Jefferson Valley CD, p. 15; DFWP Exh. 3,
18 Nelson Obj., p. 9).

19 646. During a normal flow year (50th percentile), August
20 flows would be reduced by 20 percent. During a drought (90+
21 percentile), August flows would be reduced by 41 percent. (DFWP
22 Exh. 3, Nelson Obj., p. 10).

23 647. These flow reductions would have adverse impacts on the
24 fishery resources in the Boulder River. (Bd. Exh. 27-C, Jefferson
25 Valley CD, p. 15, DFWP Exh. 3, Nelson Obj., p. 10).



1 Missouri River above Canyon Ferry Reservoir

2 648. Nine other proposed irrigation projects (BR-28, BR-34,
3 BR-35, BR-38, BR-40, BR-41, BR-42, BR-50 and BR-111) would also
4 impact flows in the Missouri River, Crow Creek, Warm Springs Creek
5 and Deep Creek, above Canyon Ferry Reservoir. (DFWP Exh. 3, Nelson
6 Obj., p. 18).

7 649. This reach of the Missouri River has a reputation as a
8 trophy trout fishery, but the fishery resources have declined as a
9 result of recent low flows. (DFWP Exh. 3, Nelson Obj., p. 19-20).

10 650. These projects, when combined with the other proposed
11 projects above Canyon Ferry, would substantially reduce flows in
12 the Missouri River above Canyon Ferry Reservoir. The projects on
13 Crow, Warm Spings and Deep Creeks would have adverse impacts on the
14 fishery reserves of those streams. (DFWP Exh. 3, Nelson Obj., p.
15 22; Bd. Exh. 40, DEIS, p. 159-161).

16
17 Missouri River Mainstem below Canyon Ferry Dam

18 651. There are 32 proposed new irrigation projects on the
19 Missouri River mainstem between Holter Dam and Virgelle. These
20 projects would divert 493 cfs from the Missouri River. Three of
21 the 12 projects proposed by Chouteau County CD would divert 419 cfs
22 or 92% of the requested amount. These projects are: CHS-3, CHS-5
23 and CHS-6. (Spence Obj., DFWP Exh. 4, p. 2).

24 652. Taking into account return flows which may return to the
25 basin from the individual projects, as determined by DNRC, the
26 depletions by these 32 projects on the Missouri River are: July -

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372.5 cfs, August - 248.97 cfs, and September - 99.93 cfs. (Spence Obj., DFWP, Exh. 4, p. 3).

653. Depletions from these 32 projects contribute to the reduced streamflows that will occur in the Missouri River in DFWP Reaches #4, #5 and #6 and which will affect flows necessary to maintain side channels in the river. At the 90th percentile, these depletions contribute 36% of the total flow reduction in July at Virgelle, 31% in August and 20% in September. (Spence Obj., DFWP Exh. 4, p. 3).

654. Projects CHS-3, CHS-5 and CHS-6, alone, would contribute 31% in July, 26% in August and 18% in September (90th percentile) of the total loss in streamflow from all upstream depletions at Virgelle. These projects would also contribute sediment to the Missouri River because of their erosive soils. (Chouteau Co. CD, Final EA, Bd. Exh. 21-C, p. 19; Spence Obj., DFWP Exh. 4, p.3).

655. Projects CHS-3 and CHS-6 would deplete flows in the Missouri River near Fort Benton to a point at which side channels important to forage fish rearing would disappear. (Chouteau Co. CD, Final EA, BD. Exh. 21-C, p. 19).

Dearborn River Sub-basin

656. Flow reductions from a single irrigation project on the Dearborn River would be small and would be most pronounced in August, where flows would decline 2.7% at the mouth. DFWP has requested 110 cfs. In about 2 years in 10, August through February flows already fall below 50 cfs. Additional reductions will

1 exacerbate summer low flow problems. (Bd. Exh. 40, DEIS, p. 162;
2 Lewis & Clark Co. CD Final EA, Bd. Exh. 29-C, p. 11).

3 657. The Dearborn project would convert 173 acres of rangeland
4 to irrigated land. The land to be converted has slopes of 8-15%.
5 Surface run-off and erosion would accelerate on these slopes and
6 add sediment to the Dearborn River. The Dearborn River is an
7 important spawning stream for rainbow trout from the Missouri
8 River. Adding fine sediment to the stream may clog gravel beds
9 important to these fish. (Bd. Exh. 40, DEIS, p. 193; Leathe Dir.,
10 DFWP Exh. 20, pp. 5-7; Lewis & Clark CD 72198-41I, Bd. Exh. 29-C,
11 (EA) p. 11; Bd. Exh. 40, DEIS, p. 68).

12 Smith River Sub-basin

13 658. DFWP has requested an instream flow of 90 cfs in Reach #1
14 of the Smith River (above Sheep Creek). A flow of 90 cfs is
15 currently not available during July through September in one year
16 in ten (90th percentile) or in August or September, two years in
17 ten (80th percentile). Three new projects above Sheep Creek (MEI-
18 11, MEI-12, and MEI-20) would further deplete flows below the
19 requested 90 cfs during low flow years and adversely affect the
20 fishery.

21 659. In the Smith River near Eden, flow would be reduced
22 substantially by five new projects proposed for development above
23 Eden (MEI-11, MEI-12, MEI-20, CS-71 and CSI-120). (Bd. Exh. 40,
24 DEIS, p. 163; Bd. Exh. 40, DEIS, p. 17). Flows during August would
25 be reduced by 2 percent during the driest year in 10. (Spence
26 Obj., DFWP Exh. 4, p. 7; Bd. Exh. 40, DEIS, p. 163).

1 660. The Smith River is an important recreational and fishery
2 resource. Flow reductions caused by these consumptive use projects
3 would adversely affect theses recreational and fishery resources.

4 661. The most popular fishery on the Smith River is between
5 Camp Baker and the Eden Bridge. Public access to this river reach
6 is gained almost exclusively by floating. (Spence Obj., DFWP Exh.
7 4, p. 6).

8 662. Floating the Smith River is currently limited to between
9 about mid-April and the first week in July in an average water
10 year. The minimum flow considered necessary to allow floaters to
11 utilize this section of the river is more than 100 cfs. The
12 floating season essentially ends when flows at Camp Baker fall
13 below 100 cfs. During July and August flows are already well below
14 100 cfs at the 90th percentile and in August at the 80th
15 percentile. The new depletions will only make those conditions
16 worse. (Spence Obj., DFWP Exh. 4, pp. 6-7; Bd. Exh. 31-C, Final
17 EA, Meagher Co. CD, p.10).

18 663. In 1991, the number of registered floaters who floated
19 the Smith River between April 1 and August 31 was 2,874 persons.
20 Most of those individuals floated prior to July 12 when the river
21 generally became unfloatable because flows at Camp Baker dropped
22 below 100 cfs. (Bd. Exh. 41, FEIS, p. 164).

23 664. DFWP has requested an instream flow of 150 cfs in Reach
24 #2 of the Smith River from Sheep Creek to Hound Creek. Sheep Creek
25 enters the Smith River at Camp Baker. (Spence Obj., DFWP Exh. 4,
26 p. 6).

1 665. Existing flows in Reach #2 of the Smith River during
2 July-September at the 90th and 80th percentiles are already below
3 the 150 cfs requested by DFWP as necessary to provide a near-
4 optimum fishery in Reach #2. Even in an average water year (50th
5 percentile), flows are below 150 cfs in August and September.
6 Further depletions by these projects would reduce these flows in
7 August by as much as 92% during the driest one year in ten.
8 (Spence Obj., DFWP Exh. 4, p. 7; Bd. Exh. 40, DEIS, p. 163).

9
10 Sun River Sub-basin

11 666. In the Sun River, July and August flows near Vaughn would
12 decline substantially if all proposed projects were developed.
13 July flows would cease near Vaughn during the driest one year in
14 ten. (Bd. Exh. 40, DEIS, p. 163).

15 667. There are 25 proposed new irrigation projects in the Sun
16 River basin requesting a total of 125.91 cfs. The largest project
17 (CSS-200) would divert 65% of this amount or 82.02 cfs. Project
18 CSS-200 is located in the lower Sun River a few miles upstream from
19 Great Falls. (Spence Obj., DFWP Exh. 4, p. 8)

20 668. The Sun River already experiences severely reduced flows
21 in late summer above Muddy Creek. Taken together, the additional
22 diversions from the Sun River above Muddy Creek would cause at
23 least a moderate adverse effect on aquatic habitat. (Cascade Co.
24 CD Final EA, Bd. Exh. 20-C, p. 24).

25 669. DFWP has requested an instream flow of 100 cfs in the Sun
26 River above Elk Creek (Reach #1). Existing flows at the Simms
27 gauge below Elk Creek are already below 100 cfs in July, August and
28

1 September during 90th and 80th percentile flow years. (Spence
2 Obj., DFWP Exh. 4, p. 9).

3 670. Depletions by five projects proposed above the Simms
4 gauge would further reduce flows under already poor flow
5 conditions. (Spence Obj., DFWP Exh. 4, p. 10).

6 671. The remaining 20 projects in the Sun River basin lie
7 below Elk Creek and the Simms gauge within Reach #2 where DFWP has
8 requested an instream flow of 130 cfs. (Spence Obj., DFWP Exh. 4,
9 p. 10).

10 672. The lower Sun River experiences dewatering during the
11 summer when irrigation demand is at its peak. Poor flows and
12 elevated water temperatures during this period have limited the
13 fishery to short river segments where irrigation return flows and
14 seepage provide only marginal flow conditions for trout. (Spence
15 Obj., DFWP Exh. 4, p. 10).

16 673. A principal impact of these 20 new projects would be to
17 reduce flows to zero at Vaughn in July at the 90th percentile.
18 Only during average years (50th percentile flows) are flows in July
19 available to meet the instream flow request of 130 cfs. (Spence
20 Obj., DFWP Exh. 4, p. 11).

21 674. New depletions on the lower Sun River will make worse an
22 already poor condition where only a marginal fishery currently
23 exists. (Spence Obj., DFWP Exh. 4, p. 11).

24 675. The diversion point for project CSS-200 (the largest
25 proposed new project on the Sun River) is below the Vaughn gauge.
26 Assuming water is still available, this project would deplete flows
27 in the Sun River below the point of diversion by an additional
28

53.54 cfs in July; 30.48 cfs in August and 6.53 cfs in September.
(Spence Obj., DFWP Exh. 4, p. 11).

676. Since the flow at the Vaughn gauge has already been reduced to 0 in July at the 90th percentile due to new upstream projects, there does not appear to be any water available for project CSS-200 in July at a 90th percentile flow level. (Spence Obj., DFWP Exh. 4, pp. 11 and 12).

677. Project CSS-200 will further deplete streamflows in July at the 90th and 80th percentile well below the 130 cfs recommended by DFWP for the lower Sun River fishery. The project may create an obstacle to boaters and floater on lower Sun River. (Spence Obj., DFWP Exh. 4, p. 12; Bd. Exh. 20-C, Cascade Co. CD, Final EA, p. 26).

678. New irrigation projects in the Sun River basin would contribute to overall deterioration of water quality in the lower Sun River. TDS concentrations are already high and return flows could raise TDS concentrations above the 500 mg/l drinking water standard. (Bd. Exh. 40, DEIS, pp 182, 186 and 187).

Belt Creek Sub-basin

679. In the lower reaches of Belt Creek, major flow reductions would occur if the proposed projects were developed on Belt Creek. Average July, August and September flows would decline 17.1, 22.0 and 10.5 percent during dry years. (Bd. Exh. 40, DEIS, p. 164).

1 680. There are seven proposed new irrigation projects in the
2 Belt Creek drainage that would divert a total of 34.05 cfs below
3 the mouth of Big Otter Creek. (Spence Obj., DFWP Exh. 4, p. 12).

4 681. DFWP has requested 35 cfs in Belt Creek below the mouth
5 of Big Otter Creek (Reach #2). Existing flows in Belt Creek are
6 already less than 35 cfs during July, August and September, except
7 in July at the 80th percentile. Proposed new depletions would have
8 severe effects on existing streamflows, particularly during August
9 and September at the 90th and 80th percentiles, causing flows
10 during these months to be well below the 35 cfs requested by DFWP.
11 (Spence Obj., DFWP Exh. 4, p. 13).

12 682. The requested instream flow of 35 cfs in Belt Creek is
13 the low inflection point flow and was requested because aquatic
14 habitat values in this reach are low, due partly to low
15 streamflows. Lower Belt Creek already experiences reduced, late-
16 summer flows which reduce aquatic habitat to marginal levels in dry
17 years. Additional depletions will cause habitat conditions to
18 become even worse than they are at the present time and adversely
19 affect the resident trout fishery and the spring sauger migrations
20 from the Missouri River. (Spence Obj., DFWP Exh. 4, pp. 13 and 14;
21 Bd. Exh. 20-C, Cascade Co. CD, Final EA, p. 25).

22 683. Project CS-42 would increase streambank erosion and
23 contribute sediment to Belt Creek. Projects CS-42 and CS-44 have
24 a high potential to contaminate a shallow (10-15 feet) aquifer with
25 pesticides and nutrients from fertilizers. (Bd. Exh. 40, DEIS, p.
26 187).

680. There are seven persons in the family.

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1 684. There are two proposed new projects in the Big Otter
2 Creek drainage - one on Big Otter Creek and one on Little Otter
3 Creek. DFWP has requested 5 cfs on Big Otter Creek but has no
4 request on Little Otter Creek. (Spence Obj., DFWP Exh. 4, p. 14).

5 685. Except during average water years (50th percentile),
6 existing flows in Big Otter Creek are less than or about equal to
7 5 cfs, except in June. Because of these existing low flow
8 conditions, the two projects, though relatively small in
9 themselves, would further reduce flows in Big Otter Creek in dry
10 and average years to levels that fall below the minimum instream
11 flow needed, thus adversely impacting the stream's fishery.
12 (Spence Obj., DFWP Exh. 4, pp. 14 and 15).

13 Teton River Sub-basin

14 686. Existing flows in the Teton River are insufficient to
15 support any new consumptive water uses. July flows at the mouth of
16 the Teton River near Loma already cease during the driest two years
17 in ten. Flows cease in August and September of average years.
18 (Bd. Exh. 40, DEIS, p. 160).

19 687. Proposed projects would cause June flows in the Teton
20 River to cease during dry years, July flows to cease in average
21 years, and August flows to drop to 3 cfs during wet years. In wet
22 years, July, August and September flows would decrease 14.4, 92.7
23 and 30.5%, respectively. (Bd. Exh. 40, DEIS, p. 168).

24 688. Flows in the Teton River at Loma during the driest two
25 years in ten are already zero, except for the months of March and
26 June. Therefore, due to existing flow conditions, flows for new
27
28

1 projects in the Teton River simply are not available during most
2 months in a dry year. (Bd. Exh. 40, DEIS, p. 169).

3 689. DFWP has an instream flow request for 35 cfs in the Teton
4 River in Reach #1 (headwaters to the discharge from Priest Butte
5 Lake near Choteau). Four new projects are proposed in this reach
6 which would divert a total of 25.33 cfs from the Teton River. The
7 depletions by these four projects would be: July, 10.63 cfs;
8 August, 3.37 cfs; and September, 1.11 cfs. (Spence Obj., DFWP Exh.
9 4, pp. 15 and 16).

10 690. July flows in a drought year (90th percentile) are
11 currently 32 cfs on the average. An additional depletion of
12 approximately 11 cfs in July would reduce existing flows at the
13 90th percentile level by 34% and at the 80th percentile level by
14 17%. It would produce a flow that is 30% below the flow requested
15 by DFWP to maintain the fishery resources in this reach. About 43%
16 of the overall depletion would occur from a single project (TEI-
17 60). (Spence Obj., DFWP Exh. 4, pp. 16 and 17).

18 691. The lower Teton River already experiences extremely low
19 flows in late summer. Additional upstream depletions would only
20 further aggravate an already poor streamflow condition in the lower
21 Teton River and contribute to lower flows in the Missouri River.
22 (Spence Obj., DFWP Exh. 4, p. 17; Bd. Exh. 33-C, Teton Co. CD Final
23 EA, p. 17).

24 692. Flows in the Teton River would be reduced substantially
25 if all the proposed projects were developed and more frequently to
26 zero, so water temperatures could rise and dissolved oxygen could
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1 drop to where aquatic life might be harmed. (Bd. Exh. 40, DEIS, p.
2 187).

3 693. Removal of vegetation along the Marias River for Project
4 TO-221 would allow erosion and sediments to pollute the Marias
5 River. (Bd. Exh. 34-C, Toole Co. CD Final EA, Bd. Exh. 34-C, p.
6 10).

7 Marias River Sub-basin

8 694. Proposed projects on the Marias river would cause major
9 reductions in the lower river flows during the summer months of
10 average and dry years. Flows near Loma would cease altogether
11 during July in the driest year in ten. (Bd. Exh. 40, DEIS, p.
12 165).

13 695. There are 29 proposed new projects to divert water in
14 the Marias River basin. Twelve of these are above Tiber Reservoir
15 and 17 below. The four largest projects are below Tiber and their
16 diversion rates are: BSS-2, 289.61 cfs; HI-269, 18.82 cfs; LI-261,
17 24.31 cfs; and LI-262, 10.51 cfs. (Spence Obj., DFWP Exh. 4, p.
18 18).

19 696. Project BSS-2 would have a major impact on stream flows
20 in the driest two years in ten (80th percentile) as measured at the
21 USGS gauge on the Marias River near Loma. This project alone would
22 reduce existing July streamflows by 33%, August flows by 25% and
23 September flows by 13%. In a drought year (90th percentile), July
24 flows would be reduced by 86%, August flows by 36%, and September
25 flows by 20%. (Spence Obj., DFWP Exh. 4, p. 19).
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697. DFWP has requested 200 cfs in the Marias River above Tiber Reservoir (Reach #1). Flows in the Marias above Tiber are already below 200 cfs in August and September of a drought year (90th percentile). The 12 new proposed projects above Tiber would further reduce streamflows below the 200 cfs instream flow requested by DFWP for the fishery in this reach by an additional 11 cfs in August and 5 cfs in September at the 90th percentile, creating flows of 169 cfs in August and 150 cfs in September. (Spence Obj., DFWP Exh. 4, p. 18).

698. In the Marias River below Tiber Reservoir, DFWP has requested 560 cfs in Reach #3. With the exception of July at the 80th percentile, streamflows are already below the requested amount in August and September, and at the 90th percentile level are below that amount in all three months. Project BSS-2, alone, would have a major impact on flow reductions and if projects HI-269, LI-261 and LI-262 are included, streamflows would become even further reduced. (Spence Obj., DFWP Exh. 4, pp. 19 and 20).

699. The accumulative effects of the 29 proposed new irrigation projects on streamflows at the mouth of the Marias River are shown below:

Depleted Flow Under the Consumptive Use Alternative (cfs)

	<u>July</u>	<u>August</u>	<u>September</u>
90%	0 (100%)	169 (54%)	186 (35%)
80%	310 (48%)	294 (38%)	351 (18%)
50%	785 (27%)	785 (22%)	698 (11%)

700. The above table shows that the lower Marias River (Reach #3) would be severely affected by depletions at the 80th and 90th

1 percentile flow levels. No flow would occur in July one year in
2 ten. August and September flows would be only 30-33% of the
3 required flow level of 560 cfs. Only during an average year (50th
4 percentile) or better would the requested flow be met or exceeded
5 July-September. (Spence Obj., DFWP Exh. 4, p. 20).

6 701. Most return flows and pollution (TDS and nutrients) from
7 project BSS-2 would enter the Milk River basin, potentially
8 creating substantial water quality risks. All six Liberty Co. CD
9 irrigation projects would contribute TDS, sediment and nutrients in
10 return flows to the Marias River. (Big Sandy CD Final EA, Bd. Exh.
11 18-C, p. 8; Liberty Co. CD Final EA, Bd. Exh. 26-C, p. 9).

12 Judith River Sub-basin

13 702. There are 21 proposed new irrigation projects in the
14 Judith River basin which would divert a total of 103.62 cfs.
15 (Spence Obj., DFWP Exh. 4, p. 21).

16 703. DFWP has requested instream flows on ten streams in the
17 Judith River basin. Conservation districts have requested water
18 reservations on three of those streams (Judith River, Big Spring
19 Creek and Warm Spring Creek). (Spence Obj., DFWP Exh. 4, p. 21).

20 704. Seven new projects in the Judith River basin above Big
21 Spring Creek would have total depletions of: July, 55.89 cfs;
22 August, 46.27 cfs; and September, 9.35 cfs. (Spence Obj., DFWP
23 Exh. 4, p. 21).

24 705. The depletions for proposed new irrigation in July and
25 August are about twice as much as the requested instream flow
26 (which is a high inflection point flow), and the resulting flow
27
28



1 reductions will adversely affect the fishery. (Spence Obj., DFWP
2 Exh. 4, p. 22).

3 706. Project FEI-50, alone, would comprise 71% of the total
4 depletions in each of the months July through September. (Spence
5 Obj., DFWP Exh. 4, p. 22).

6 707. DFWP has requested an instream flow of 110 cfs in Big
7 Spring Creek. There are four proposed irrigation projects in Big
8 Spring Creek basin which will deplete a maximum of about 3 cfs.
9 Any reservations granted for these four projects will be junior to
10 the DFWP's instream Murphy Right. (Spence Obj., DFWP Exh. 4, pp.
11 22 and 23). (Spence Obj., DFWP Exh. 4, p. 22).

12 708. There are three proposed new irrigation projects on Warm
13 Spring Creek that request a total of 19.15 cfs. The largest
14 project (FEI-40) would divert 13.69 cfs of this amount. (Spence
15 Obj., DFWP Exh. 4, p. 23).

16 709. The depletions which would occur in Warm Spring Creek
17 from these three projects are: July, 12.76 cfs; August, 10.73 cfs;
18 and September, 2.36 cfs. (Spence Obj., DFWP Exh. 4, p. 23).

19 710. DFWP has requested 110 cfs in Warm Spring Creek. Stream
20 flows are already below 110 cfs in all months except September at
21 the 80th percentile flow level. The projects would further reduce
22 streamflows below that requested by DFWP in July through September
23 of both dry and drought years (90th and 80th percentile). (Spence
24 Obj., DFWP Exh. 4, p. 23).

25 711. The 21 proposed new irrigation projects in the Judith
26 River basin will deplete existing streamflows as they exist at the
27 mouth of the Judith River. The total amount requested for all 21
28

1 projects is 128.37 cfs. Of this amount, the three largest projects
2 (FEI-40, FEI-50, and JBI-2) will divert 90.28 cfs which is 70% of
3 the total diversions for the 21 projects. (Spence Obj., DFWP Exh.
4 4, p. 24).

5 712. DFWP has requested 160 cfs (the low inflection point
6 flow) in the Judith River below Big Spring Creek (Reach #2). The
7 21 projects would reduce flows in the Judith River by as much as
8 33% in July of a drought year and 20% in August of a dry year.
9 (Spence Obj., DFWP Exh. 4, pp. 24 and 25).

10 Musselshell River Sub-basin

11 713. The Lower Musselshell Conservation District has proposed
12 the only new irrigation project in the Musselshell River basin.
13 This project would involve pumping water from abandoned underground
14 coal mines to supplement late summer flows in the Musselshell
15 River. The requested amount is 90 cfs (8,150 AF/yr). (Spence
16 Obj., DFWP Exh. 4, pp. 26 and 27).

17 714. At the time the conservation district application was
18 developed, it was thought that the Jeffrey Mine was connected to
19 larger mines to the south which have the volume to store the bulk
20 of the water requested. However, more recent data collected by the
21 Montana Bureau of Mines and Geology show that the Jeffrey Mine is
22 not connected to the other mines. Thus, the project is not
23 feasible as proposed. (Bd. Exh. 40, DEIS, p. 175).

24 Cumulative Effects of All Projects on the Missouri River

25 715. Eighteen conservation districts, 17 municipalities and
26 the Bureau of Reclamation have submitted applications for new
27
28



1 consumptive uses in the Missouri basin above Fort Peck Dam.
2 (Spence Obj., DFWP Exh. 4, p. 27; Bd. Exh. 40, DEIS, pp. 14 through
3 21, 35, 36, and 39).

4 716. The cumulative effects of these new uses on Missouri
5 River streamflow were determined from DNRC's Missouri basin water
6 availability model. Stream flow reductions from all municipal
7 consumption would be less than 1 percent for all months during wet,
8 average and dry years. (Bd. Exh. 41, DEIS, p. 30; Spence Obj.,
9 DFWP Exh. 4, p. 27).

10 717. The cumulative effects can be shown by comparing the base
11 line (existing) flows on the Missouri River at the USGS gauge near
12 Landusky to the flows which would occur at the same site under the
13 Consumptive Use, Combination and Instream Alternatives. The
14 Landusky gauge is the lowermost flow measuring point on the
15 Missouri River above Fort Peck Reservoir. The Musselshell River is
16 excluded from this analysis since it directly enters Fort Peck
17 Reservoir at another location. (Spence Obj., DFWP Exh. 4, p. 27).

18 718. Table 5 shows the baseline flows and flows which would
19 occur under each of the three alternatives for the 90th, 80th and
20 50th percentiles. (Spence Obj., DFWP Exh. 4, pp. 27 and 28).

21 719. Table 6 shows the flow reductions which would occur under
22 the three alternatives at Landusky. (Spence Obj., DFWP Exh. 4, p.
23 29).

24 720. Under all three alternatives, the greatest reduction in
25 flow will occur in July, followed by August and September. (Spence
26 Obj., DFWP Exh. 4, p. 28).

Table 5

Baseline Flows

	<u>June</u>	<u>July</u>	<u>August</u>	<u>Sept.</u>	<u>Oct.</u>	<u>12-Month Average</u>
90%	6781	4323	3907	4368	4525	5043
80%	8989	4972	4100	4799	5411	6021
50%	15,554	8313	5875	5639	4118	8591

Source: DEIS page C-9

Consumptive Use Alternative Flows

	<u>June</u>	<u>July</u>	<u>August</u>	<u>Sept.</u>	<u>Oct.</u>	<u>12-Month Average</u>
90%	5973	3288	3097	3865	4530	4727
80%	8448	3784	3456	4368	5204	5681
50%	14,850	6944	5137	5367	6901	8291

Source: DEIS, page C-14

Combination Alternative Flows

	<u>June</u>	<u>July</u>	<u>August</u>	<u>Sept.</u>	<u>Oct.</u>	<u>12-Month Average</u>
90%	6453	3924	3584	4095	4529	4926
80%	8768	4428	3829	4617	5681	5888
50%	15,279	7800	5556	5502	6994	8475

Source: DEIS, page C-18

Instream Alternative Flows

	<u>June</u>	<u>July</u>	<u>August</u>	<u>Sept.</u>	<u>Oct.</u>	<u>12-Month Average</u>
90%	6705	4211	3828	4279	4527	5014
80%	8922	4829	4031	4746	5736	5983
50%	15,477	8171	5806	5604	7032	8560

Source: DEIS, page C-23

Table 6

Flow Reductions at Landusky Under Three Alternatives
(CFS)

Consumptive Use Alternative

	<u>July</u>	<u>August</u>	<u>September</u>
90%	1,035 (24%)	810 (21%)	503 (12%)
80%	1,188 (24%)	644 (16%)	431 (9%)
50%	1,369 (16%)	738 (13%)	272 (5%)

Combination Alternative

	<u>July</u>	<u>August</u>	<u>September</u>
90%	399 (9%)	323 (8%)	273 (6%)
80%	544 (11%)	271 (7%)	182 (4%)
50%	513 (6%)	319 (5%)	137 (2%)

Instream Alternative

	<u>July</u>	<u>August</u>	<u>September</u>
90%	112 (3%)	79 (2%)	89 (2%)
80%	143 (3%)	69 (2%)	53 (1%)
50%	142 (2%)	69 (1%)	35 (1%)

1 721. The greatest flow reductions will occur if all projects
2 are developed. In July, a 24% reduction would occur at the 90th
3 and 80th percentile flow levels. The next highest reductions would
4 occur in August at the 90th and 80th percentiles where a 21% and
5 16% reduction would occur, respectively. Even in an average water
6 year, 50th percentile, July flow reductions would be 16%, with
7 lesser reductions in August and September. (Spence Obj., DFWP Exh.
8 4, p. 29).

9 722. Under the combination alternative, flows in July would be
10 reduced 9% and 11%, respectively, for the 90th and 80th percentile
11 flows. (Spence Obj., DFWP Exh. 4, p. 29).

12 723. Flow reductions are least for the Instream Alternative,
13 the greatest reduction being 3% in July at both the 90th and 80th
14 percentile flows. (Spence Obj., DFWP Exh. 4, p. 29).

15 724. DFWP has requested 5,800 cfs as an instream flow in Reach
16 #6 of the Missouri River from July 6 to August 31 to maintain
17 proper flow in side channels. (Spence Obj., DFWP Exh. 4, p. 29).

18 725. In July of dry years, flows are already below that amount
19 by about 800-1,500 cfs. (Spence Obj., DFWP Exh. 4, p. 29).

20 726. Only in an average water year are flows above 5,800 cfs.
21 During August, flows are well below 5,800 cfs at both the 90th and
22 80th percentiles by about 1,700-1,900 cfs, respectively. Even in
23 an average water year, baseline flows are already approaching 5,800
24 cfs in August. (Spence Obj., DFWP Exh. 4, pp. 29 and 30).

25 727. Further reduction in the flow levels in the Missouri
26 River will cause more frequent periods when flow levels in side
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1 channels will be inadequate to maintain these important fish
2 habitats. (Spence Obj., DFWP Exh. 4, p. 30).

3
4 Bureau of Reclamation

5 728. The Bureau of Reclamation has applied for up to 280 cfs
6 (89,000 acre feet per year) from April 1 to October 30 to provide
7 supplemental and new full service irrigation in the Milk River
8 drainage. (Spence Obj., DFWP Exh. 4, p. 25).

9 729. Water would be diverted from the Missouri River about two
10 miles above the town of Virgelle and transported through a canal to
11 a point on the Milk River, about four miles upstream from the city
12 of Havre. There would be no return flows to the Missouri River.
13 (Spence Obj., DFWP Exh. 4, p. 25).

14 730. Depletions from this project would reduce fish habitat in
15 side channels of the Missouri River which are important rearing
16 areas for sauger, goldeye, smallmouth buffalo and bigmouth buffalo.
17 (Spence Obj., DFWP Exh. 4, p. 25).

18 731. DFWP has requested 5,400 cfs for instream flows in the
19 Missouri River from the mouth of the Marias River to the mouth of
20 the Judith River (Reach #5) to maintain adequate flow in the side
21 channels during the period July 6 - August 31. This flow is
22 presently not available in July and August of low flow years.
23 (Spence Obj., DFWP Exh. 4, p. 25; Spence Obj., DFWP Exh. 4, p. 26).

24 732. If an additional 280 cfs is diverted, already inadequate
25 flows for side channels are further reduced below 5,400 cfs in July
26 and August at the 90th and 80th percentiles, respectively. In an
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1 average year (50th percentile), flows fall below 5,400 cfs in
2 August. (Spence Obj., DFWP Exh. 4, p. 26).

3 733. DFWP has requested 4,300 cfs to maintain the main channel
4 riffle areas between September 1 and March 14. This flow is not
5 presently available in September at the 90th percentile and would
6 not be present in September at either the 90th or 80th percentiles
7 with an additional 280 cfs withdrawal. (Spence Obj., DFWP Exh. 4,
8 p. 26).

9 Water Availability Model Predictions for
10 Canyon Ferry Reservoir Operation

11 734. DNRC developed a computer model to analyze physical and
12 legal water availability in the Missouri basin and to assess the
13 impacts that the proposed reservation requests could have on
14 streamflows, reservoir levels and hydropower production. Canyon
15 Ferry Reservoir was included in this analysis. (Bd. Exh. 40, DEIS,
16 p. C-3).

17 735. Under baseline conditions and for each of the three
18 alternatives reviewed in the DEIS, releases from Canyon Ferry
19 Reservoir never dropped below 2,900 cfs during any month of the
20 year under any percentile flow (Table 7). (Bd. Exh. 40, DEIS,
21 Table C-2).

22 736. For baseline conditions and the three alternatives
23 presented in the DEIS, the water availability model calculated
24 reservoir elevations in Canyon Ferry Reservoir. (Bd. Exh. 40,
25 DEIS, Table C-4).

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27
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Table 7

Table C-2. Monthly streamflow percentile distributions (In cfs)

BASELINE CONDITIONS

MODEL NODE	%FLOW	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVG
CANYON FERRY 14	Average	4619	4668	4689	4172	4356	5360	5795	6205	6049	4959	3718	3812	4867
RESERVOIR	10	5511	5628	5846	5880	6000	8170	8810	9457	9214	7837	5460	5473	6941
OUTFLOWS TO	20	5373	5459	5577	5362	5591	6807	7399	8003	7750	6416	4603	4695	6086
MISSOURI RIVER	50	4831	4830	4835	4080	4172	5289	5777	6276	6067	<u>4357</u>	<u>2928</u>	<u>3026</u>	<u>4706</u>
	80	3901	3900	3905	2928	3242	2928	3142	3373	<u>3287</u>	<u>2928</u>	<u>2928</u>	<u>3026</u>	<u>3291</u>
	90	2928	3026	2928	2928	3242	2928	3026	2928	3026	2928	2928	3026	2987

Consumptive use alternative (continued)

CANYON FERRY 14	Average	4519	4603	4606	4127	4270	5310	5741	6141	5990	4611	3480	3654	4754
RESERVOIR	10	5498	5630	5840	5814	5950	8146	8785	9429	9187	7231	5178	5233	6827
OUTFLOWS TO	20	5364	5461	5581	5317	5430	6754	7341	7939	7689	5882	4281	4508	5962
MISSOURI RIVER	50	4766	4764	4770	4020	3985	5223	5707	6197	5995	3845	2928	3026	4602
	80	2928	3602	3606	2928	3242	2928	3026	2928	3026	2928	2928	3026	3091
	90	2928	3026	2928	2928	3242	2928	3026	2928	3026	2928	2928	3026	2987

Combination alternative (continued)

CANYON FERRY 14	Average	4584	4642	4650	4159	4340	5338	5770	6176	6021	4816	3634	3733	4822
RESERVOIR	10	5504	5625	5848	5868	5983	8162	8801	9447	9205	7595	5346	5359	6895
OUTFLOWS TO	20	5382	5464	5597	5346	5530	6789	7378	7980	7729	6202	4477	4608	6040
MISSOURI RIVER	50	4827	4826	4831	4058	4156	5265	5752	6244	6041	4150	2928	3026	4675
	80	3778	3777	3781	2928	3242	2928	3026	3082	3026	2928	2928	3026	3204
	90	2928	3026	2928	2928	3242	2928	3026	2928	3026	2928	2928	3026	2987

Instream alternative (continued)

CANYON FERRY 14	Average	4608	4658	4671	4168	4352	5352	5787	6197	6041	4916	3705	3787	4853
RESERVOIR	10	5508	5628	5848	5877	5995	8167	8807	9454	9211	7766	5427	5440	6927
OUTFLOWS TO	20	5376	5459	5578	5357	5571	6801	7392	7995	7743	6355	4565	4658	6071
MISSOURI RIVER	50	4832	4830	4836	4074	4166	5283	5770	6264	6060	4300	2928	3026	4697
	80	3865	3864	3868	2928	3242	2928	3095	3327	3241	2928	2928	3026	3270
	90	2928	3026	2928	2928	3242	2928	3026	2928	3026	2928	2928	3026	2987

Table C-1. Summary of the results of the 1990-1991 survey of the

Basin and Range province

Notes:

CANYON-
RIVER
OUT-
MIS-

Notes:

CANYON-
RIVER
OUT-
MIS-

Notes:

CANYON-
RIVER
OUT-
MIS-

Notes:

CANYON-
RIVER
OUT-
MIS-

Table 8

Table C-4. Monthly reservoir elevations, contents, and energy production

Baseline run

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVG
--	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Canyon Ferry Operations

Elevations (feet):

Average	3786	3786	3784	3782	3781	3779	3779	3784	3793	3791	3787	3785	3785
10th%	3793	3793	3791	3790	3791	3789	3791	3794	3797	3796	3793	3792	3792
20th%	3791	3792	3789	3788	3787	3787	3787	3792	3797	3796	3792	3791	3791
50th%	3789	3789	3787	3785	3784	3782	3780	3785	3797	3796	3791	3790	3788
80th%	3786	3786	3785	3783	3779	3775	3773	3778	3796	3791	3788	3786	3784
90th%	3774	3774	3773	3772	3770	3771	3765	3773	3788	3784	3779	3774	3775

Consumptive use alternative

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVG
--	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Canyon Ferry Operations

Elevations (feet):

Average	3784	3785	3783	3781	3780	3778	3778	3783	3792	3790	3785	3784	3784
10th%	3792	3792	3790	3790	3791	3790	3792	3794	3797	3796	3793	3791	3792
20th%	3791	3792	3789	3787	3787	3786	3787	3792	3797	3796	3792	3790	3790
50th%	3789	3789	3787	3785	3784	3780	3780	3785	3797	3795	3790	3790	3788
80th%	3782	3784	3783	3780	3778	3775	3771	3778	3793	3790	3785	3782	3782
90th%	3770	3770	3769	3768	3766	3769	3766	3773	3784	3779	3773	3770	3771

Combination alternative

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVG
--	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Canyon Ferry Operations

Elevations (feet):

Average	3785	3785	3784	3782	3781	3779	3778	3783	3793	3791	3786	3785	3784
10th%	3792	3793	3790	3790	3791	3790	3791	3794	3797	3796	3793	3792	3792
20th%	3791	3792	3789	3787	3787	3787	3787	3792	3797	3796	3792	3790	3791
50th%	3789	3789	3787	3785	3784	3782	3780	3785	3797	3796	3791	3790	3788
80th%	3785	3785	3785	3782	3779	3774	3772	3778	3796	3791	3787	3785	3783
90th%	3772	3772	3771	3771	3769	3770	3765	3773	3787	3783	3777	3773	3774

Instream alternative

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVG
--	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Canyon Ferry Operations

Elevations (feet):

Average	3785	3786	3784	3782	3781	3779	3778	3784	3793	3791	3787	3785	3785
10th%	3793	3793	3791	3790	3791	3789	3791	3794	3797	3796	3793	3792	3792
20th%	3791	3792	3789	3788	3787	3787	3787	3792	3797	3796	3792	3791	3791
50th%	3789	3789	3787	3785	3784	3782	3780	3785	3797	3796	3791	3790	3788
80th%	3786	3786	3785	3782	3779	3774	3773	3778	3796	3791	3787	3786	3784
90th%	3774	3773	3773	3772	3770	3771	3765	3773	3788	3783	3778	3774	3774

Table C-1. Monthly average water levels at various locations in the Sacramento-San Joaquin River Delta, 1950-1999.

Location	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sacramento River	10.5	10.8	11.2	11.5	11.8	12.2	12.5	12.8	13.2	13.5	13.8	14.2
	14.5	14.8	15.2	15.5	15.8	16.2	16.5	16.8	17.2	17.5	17.8	18.2
	18.5	18.8	19.2	19.5	19.8	20.2	20.5	20.8	21.2	21.5	21.8	22.2
	22.5	22.8	23.2	23.5	23.8	24.2	24.5	24.8	25.2	25.5	25.8	26.2
	26.5	26.8	27.2	27.5	27.8	28.2	28.5	28.8	29.2	29.5	29.8	30.2
San Joaquin River	10.5	10.8	11.2	11.5	11.8	12.2	12.5	12.8	13.2	13.5	13.8	14.2
	14.5	14.8	15.2	15.5	15.8	16.2	16.5	16.8	17.2	17.5	17.8	18.2
	18.5	18.8	19.2	19.5	19.8	20.2	20.5	20.8	21.2	21.5	21.8	22.2
	22.5	22.8	23.2	23.5	23.8	24.2	24.5	24.8	25.2	25.5	25.8	26.2
	26.5	26.8	27.2	27.5	27.8	28.2	28.5	28.8	29.2	29.5	29.8	30.2
Delta	10.5	10.8	11.2	11.5	11.8	12.2	12.5	12.8	13.2	13.5	13.8	14.2
	14.5	14.8	15.2	15.5	15.8	16.2	16.5	16.8	17.2	17.5	17.8	18.2
	18.5	18.8	19.2	19.5	19.8	20.2	20.5	20.8	21.2	21.5	21.8	22.2
	22.5	22.8	23.2	23.5	23.8	24.2	24.5	24.8	25.2	25.5	25.8	26.2
	26.5	26.8	27.2	27.5	27.8	28.2	28.5	28.8	29.2	29.5	29.8	30.2

Table 9

**Canyon Ferry Reservoir Water Surface
Elevation Changes Under EIS Alternatives**

Elevation Change (feet)

Consumptive Use Alternative

% Flow	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep
50	0	0	0	0	0	-2	0	0	0	-1	-1	0
80	-4	-2	-2	-3	-1	0	-2	0	-3	-1	-3	-4
90	-4	-4	-4	-4	-4	-2	+1	0	-4	-5	-6	-4
Avg.	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-1

Combination Alternative

50	0	0	0	0	0	0	0	0	0	0	0	0
80	-1	-1	0	-1	0	-1	-1	0	0	0	-1	-1
90	-2	-2	-2	-1	-1	-1	0	0	-1	-1	-2	-1
Avg.	-1	-1	0	0	0	0	-1	-1	0	0	-1	0

Instream Alternative

50	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	-1	0	-1	0	0	0	0	-1	0
90	0	-1	0	0	0	0	0	0	0	-1	-1	0
Avg.	-1	0	0	0	0	0	-1	0	0	0	0	0

517.44

1 737. Table 8 summarizes the reservoir elevations under
2 baseline conditions and for the three alternatives that are found
3 in Table C-4 of the DEIS (Bd. Exh. 40).

4 738. Table 9 compares the differences in water surface
5 elevations of Canyon Ferry Reservoir between baseline conditions
6 and conditions which would occur under each of the three
7 alternatives. These calculations were made from information in
8 Table C-4 of the DEIS.

9 739. The most significant impacts to reservoir levels will
10 occur if all proposed projects are developed. During the
11 recreation season (June through September), water surface
12 elevations will, on the average, be one to two feet lower than
13 under existing conditions. During the driest one year in ten, the
14 reservoir will be four to six feet lower than now occurs and, in
15 the driest two years in ten, reservoir levels will be from one to
16 four feet lower than currently exist.

17 740. By maintaining minimum reservoir releases from Canyon
18 Ferry Reservoir the same for each of the alternatives, the
19 reservoir, under the Consumptive Use Alternative will be drafted
20 from four to six feet below baseline conditions to meet the minimum
21 flows in the Missouri River during the recreation season, whereas
22 under the Combination and Instream alternatives it is not necessary
23 to draft the reservoir as much to provide downstream flows because
24 fewer new water uses would occur upstream.

25 741. The flows released from Canyon Ferry Reservoir are
26 utilized in the water availability model for predicting flows in
27
28

1 lower reaches of the Missouri River. (Bd. Exh. 40, DEIS, pp. C-3
2 and C-4).

3 742. It appears Canyon Ferry Reservoir was drafted to provide
4 a minimum 2,900-3,000 cfs in the Missouri River below Canyon Ferry
5 Reservoir. Any problems which may occur because of drops in
6 reservoir levels (such as effects on recreational facilities,
7 public docks and private marinas) could cause these minimum
8 releases to be less than 2,900-3,000 cfs. If this should occur,
9 predictions of streamflows in the Missouri River downstream from
10 Canyon Ferry Dam, as presented in the DEIS, would be overly
11 optimistic and impacts to the Missouri River fishery would be more
12 severe than presented in the Draft and Final EIS and in DFWP's
13 testimony.

14
15 (b) Water Quality

16 743. Arsenic that originates in Yellowstone National Park is
17 present in high concentrations in the Madison and Missouri Rivers.
18 (Bd. Exh. 40, DEIS, p. 182.)

19 744. Arsenic concentrations exceed federal and state instream
20 standards in the Madison and Missouri Rivers in Montana. These
21 concentrations also exceed the federal drinking water standards in
22 the Madison River and the portion of the Missouri River upstream
23 from Toston Dam. (Bd. Exh. 41, FEIS, p. S-4).

24 745. Arsenic is a known carcinogen. (Bd. Exh. 41, FEIS, p.
25 S-4; Tr. Day 13, Horpestad Cross, p. 207).

26 746. Reservations that lead to new consumptive water uses in
27 the Missouri River Basin will increase the concentration of arsenic
28

1 lower reaches of the Mississippi River

2 and G-4

3 742 is approximately 100 miles

4 a number of miles from the mouth of the river

5 Rivermouth. The river is about 100 miles

6 long. The river is about 100 miles

7 long. The river is about 100 miles

8 long. The river is about 100 miles

9 long. The river is about 100 miles

10 long. The river is about 100 miles

11 long. The river is about 100 miles

12 long. The river is about 100 miles

13 long. The river is about 100 miles

14 long. The river is about 100 miles

15 long. The river is about 100 miles

16 long. The river is about 100 miles

17 long. The river is about 100 miles

18 long. The river is about 100 miles

19 long. The river is about 100 miles

20 long. The river is about 100 miles

21 long. The river is about 100 miles

22 long. The river is about 100 miles

23 long. The river is about 100 miles

24 long. The river is about 100 miles

25 long. The river is about 100 miles

26 long. The river is about 100 miles

27 long. The river is about 100 miles

28 long. The river is about 100 miles

1 in the Missouri River and adjacent ground water systems. (Bd. Exh.
2 41, FEIS, p. S-4; Tr. Day 14, Horpestad Cross, p. 10).

3 747. Arsenic can be removed from a water source through a
4 number of ways. However, treating this water and returning it to
5 the Madison or Missouri River channels for subsequent downstream
6 use is impractical and cost prohibitive. (Bd. Exh. 41, FEIS, p.
7 74).

8 748. Treating surface flow to reduce basin-wide arsenic
9 concentrations is impractical because of the relatively large
10 volume of flow, even near the source of arsenic. In addition to
11 costing several hundred million dollars, the most effective
12 treatment methods would remove other nutrients and chemical
13 constituents and alter downstream water quality, which are critical
14 for maintaining aquatic habitat and the fisheries resources in the
15 Madison River. (Bd. Exh. 41, FEIS, p. 78; Tr. Day 14, Horpestad
16 Cross, p. 127).

17 749. High arsenic concentrations in the Missouri River
18 present a substantial health risk which would be aggravated by
19 further consumptive depletions. (Bd. Exh. 41, FEIS, p. 75).

20 750. Since depletions will cause an increase in the arsenic
21 concentrations in the Madison and Missouri Rivers and will result
22 in an increase in the expectant number of cancers in the population
23 that are dependent upon these rivers for its drinking water supply,
24 any such depletions will violate state law. (Bd. Exh. 41, FEIS,
25 p.76; Tr. Day 14, Horpestad Cross, p. 19).

26 751. Maintenance of dilution flows appears to be the only
27 cost effective method to control arsenic levels and is required to
28

1 comply with recent changes in state and federal water quality
2 standards for arsenic. (Bd. Exh. 41, FEIS, p. 77).

3 752. Reservoirs in the Missouri River Basin could not be
4 effectively managed for arsenic reduction in downstream water
5 supplies. (Bd. Exh. 41, FEIS, p. 78; Tr. Day 14, Horpestad Cross,
6 p. 57).

7 753. Because fertilizer and pesticides are commonly used on
8 agricultural crops, many of the proposed irrigation projects have
9 the potential to contribute nutrients and pesticides to shallow
10 groundwater and nearby streams (Table 10). (Bd. Exh. 40, DEIS, p.
11 183 and Table 6-9, p. 184).

12 754. Dissolved oxygen levels can be reduced when nutrients
13 are added to a stream or other water body. Greatest effects occur
14 on streams where water temperatures are high and stream flows and
15 dissolved oxygen levels are already low. Dissolved oxygen levels
16 are reduced as water temperature increases. (Bd. Exh. 40, DEIS,
17 pp. 183, 184).

18 755. Many streams already have low flow problems and proposed
19 new consumptive use permits could increase water temperatures and
20 decrease oxygen (Table 11). (Bd. Exh. 40, DEIS, p. 184 and Table
21 6-10, pp. 185, 186).

22
23 (6) Other Factors [ARM 36.16.107B(4)(f)]

24 756. The development of irrigation projects would not
25 significantly increase total employment and income in the Missouri
26 River Basin. (Bd. Exh. 40, DEIS, p. 233; MPC Exh. 5, Polzin Dir.,
27 Attach. B).
28

Table 10

Table 6-9. Projects with potential to cause nutrient and pesticide contamination

	Gallatin	Jefferson/ Boulder rivers	Missouri River - Three Forks to Holter Dam	Missouri River - Holter Dam to Belt Creek	Smith River	Sun River	Belt Creek	Marias River	Teton River	Missouri River - Belt Creek to Fort Peck Reservoir	Judith River
Consumptive Use Alternative	GA-13	JV-201	BR-38	CS-541	CSI-111	CS-31	CS-42	LI-161	TE-321	CHS-3	FEI-50
	GA-14	JV-202	BR-34	CSI-103	CSI-120	CS-51	CS-44	LI-162	TEI-40	CHS-5	FEI-40
	GA-35	JV-203	BR-104	CSI-12	CS-68	CS-32		LI-263	TE-411	CHS-6	FE-671
	GA-79	JV-95	BR-103	CSI-41		CSI-81		TO-221	TE-281	CH-541	FE-672
	GA-81	JV-17	LC-11	LC-210		TEI-80		CHI-52	TE-282		FE-673
	GA-44	JV-18		CSI-82		TEI-100		LI-262			
	GA-46	BR-101		CSI-83		TEI-571		LI-261			
	GA-124			CSI-92				LI-91			
	GA-143			CSI-91				GL-201			
Instream Alternative	None	None	BR-38	CS-541	CSI-11	CSI-81	None	LI-161	TE-321	None	FE-671
			BR-34	CSI-103		TEI-571		LI-162			FE-672
				CSI-12							FE-673
				CSI-41							
				CSI-82							
				CSI-83							
Combination Alternative	GA-79	BR-101	None	CS-541	CSI-111	CSI-81	CS-42	LI-161	TE-321	CHS-3	FEI-40
	GA-46			CSI-103	CSI-120	TEI-571	CS-47	LI-162		CHS-5	FE-671
	FA-143			CSI-12	CS-63			LI-268		CHS-6	FE-572
	GA-44			CSI-41				TO-221			FE-673
	GA-124			CSI-82				CHI-52			
				CSI-83				LI-262			
				CSI-92				LI-261			
				CSI-91				LI-91			
								GL-201			

Table 11

Table 6-10. Requested consumptive use reservations that might damage aquatic life by increasing water temperatures and decreasing dissolved oxygen under the different alternatives

Subbasin/Streams	Consumptive Use Alternative	Instream Alternative	Combination Alternative	Subbasin/Streams	Consumptive Use Alternative	Instream Alternative	Combination Alternative	Subbasin/Streams	Consumptive Use Alternative	Instream Alternative	Combination Alternative
Headwaters Subbasin				Sun River	TEI-80	CS-241	CSI-83	Teton River main stem	CHI-61	TE-321	TE-321
East Gallatin River	GA-40	None	GA-41		CS-241	CSI-83	CSI-81		TE-321	CH-641	CH-641
	GA-41		GA-79		CSI-83	CSI-81	CSI-82		CHI-72	TE-101	TE-101
	GA-79		GA-46		CSI-81	CSI-82	CSI-92		TEI-40	TE-591	TE-101
	GA-24		GA-143		CSI-82	CSI-92	CSI-91		TEI-30		
	GA-46		GA-44		CSI-71	TE-571	TE-181		CHI-74		
	GA-13		GA-151		TEI-100				TEI-10		
	GA-143		GA-124		CS-171		TE-183		TEI-50		
	GA-44		GA-14		CS-471		LC-131		TE-411		
	GA-151		GA-35		CSI-92		TE-571		TEI-60		
	GA-124		GA-92		TEI-90				CHI-80		
	GA-110				CSI-91				TEI-20		
	GA-14				CS-31				TE-281		
	GA-92				CS-51				TE-282		
<i>Madison River</i>	<i>GA-201</i>	<i>None</i>	<i>GA-201</i>		CS-32				TEI-70		
Jefferson River	BR-52	None	BR-52		CS-200				CH-381		
	BR-101		BR-101		CS-231				CH-641		
	GA-102		GA-102		TE-181				TE-101		
	JV-203		JB-55		TE-183				TE-81		
	JV-55				CS-21				TE-581		
	JV-95				LC-131				TE-591		
	JV-204				TE-571				TE-401		
	JV-202				LC-251				TE-361		
	JV-25								CH-381		
Boulder River	JV-18	None	JV-18	Belt Creek	CS-43	CS-43	CS-43	Middle Missouri Subbasin			
	JV-80		JV-80		CS-42	JB-281	CS-42	Unnamed tributary of			
	JV-17		JV-17		CS-44		CS-44	Big Sag Creek	CH-551	CH-551	CH-551
	JV-81		JV-81		CS-159		CS-159	Shonkin Creek	CH-201	CH-201	CH-201
	JV-63		JV-63		CHS-1		JB-281				
					JB-281		JB-61				
					JB-61						
Upper Missouri Subbasin				Marias/Teton Subbasin				Unnamed tributary of			
Deep Creek	BR-28	BR-28	BR-28	Cut Bank Creek	GL-221	GL-221	GL-221	Campbell Coulee	FE-42	None	None
	BR-29				GL-11	GL-11	GL-11	Wolverine Creek	FE-141	FE-141	FE-141
Crow Creek	BR-35	BR-35	BR-35					Running Wolf Creek	JBS-3	JB-261	JBS-3
Warm Springs Creek	BR-44	BR-44	BR-35	Unnamed tributary of				Wolf Creek	FE-81	None	None
	BR-40	BR-40	BR-40	Bullhead Creek	PO-411	None	PO-411	Little Casino Creek	FE-431	FE-431	FE-431
	BR-41	BR-41	BR-41		PO-271		PO-271	Olsen Creek	FE-671	FE-671	FE-671
	BR-42	BR-42	BR-42	Timber Coulee	TO-421	None	TO-421	Louse Creek	JB-21	JB-231	JB-21
Smith River	CS-61	CS-61	CS-61	Laughlin Coulee	PO-91				JB-231	JB-232	JB-231
	GS-71	CSI-102	CS-71						JB-232		JB-232
	CSI-120	CS-251	CSE-102	Spring Coulee	TE-361	None	None				
	CS-251	CS-271	CS-251	Gamble Coulee	TE-581	TE-591	TE-591				
	CS-252	CS-331	CS-252		TE-591						
	CS-271		CS-271	Unnamed tributary of	TE-401	None	None	McCarthy Creek	JB-111	None	JB-111
	CS-331		CS-331	Teton River							
	CSI-102		CSI-120								

the 1970s, the government was not able to control the inflation rate and the economy was in a state of stagflation.

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030																																																																																																																								
GDP	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000

Source: Bureau of Economic Analysis

Table 1

Table 2

Table 3

Table 4

Table 5

Table 6

Table 7

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1 757. Increased tax receipts as a result of new irrigation
2 would not be significant in the Missouri River Basin. (Bd. Exh.
3 40, DEIS, p. 233; Bd. Exh. 41, FEIS, p. 108).

4 758. Little additional permanent employment would result from
5 the development of new irrigation projects. (Bd. Exh. 40, DEIS, p.
6 236).

7 759. Since the value of water used for irrigation is less
8 than the value of the water for instream uses, any projects granted
9 a reservation in this proceeding should be junior in priority to
10 instream flow reservations. This will insure that minimum instream
11 flows are maintained or that presently dewatered streams are not
12 further dewatered below the levels needed to maintain aquatic
13 habitat.

14
15 (7) Summary -- Public Interest Criteria

16 760. Project GA-201 would have greater costs than benefits,
17 substantial adverse impacts on existing instream flows and flow
18 rights in the Madison River as well as significant adverse water
19 quality impacts in the Madison, Missouri and Gallatin River Basins.
20 (Finding 608).

21 761. For these reasons, a reservation for GA-201 is not in
22 the public interest.

23 762. Projects THE-321, CHI-61, THE-591, THE-101, THE-581,
24 TEI-40, CHI-80, CHI-72 and CHI-74, in the Teton River basin, would
25 adversely impact existing water rights, severely deplete and worsen
26 an already seriously dewatered stream, and cause significant water

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World War II

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quality problems. (Finding 609). For these reasons, a reservation for these projects is not in the public interest.

763. The following projects, all of which are above Canyon Ferry Dam, would adversely affect existing instream and storage water rights, worsen existing seriously dewatered stream conditions, adversely affect water quality and aquatic life in the Gallatin, Jefferson, Boulder and Missouri River basins, and adversely impact water levels in Canyon Ferry Reservoir:

Jefferson River Basin

BR-52	JV-201
BR-101	JV-202
JV-25	JA-203
JV-55	JA-204
JV-95	GA-102

Boulder River Basin

JV-17	JV-80
JV-18	JV-81
JV-63	

Missouri River Basin

BR-34	BR-50
BR-38	BR-111
BR-28	BR-35
BR-40	BR-41
BR-42	

Gallatin River Basin

GA-13	GA-79
GA-14	GA-81
GA-24	GA-92
GA-35	GA-110
GA-40	GA-124
GA-41	GA-130
GA-44	GA-143
GA-46	GA-151

These projects are not in the public interest. (Findings 631-650, 734-742).

764. The following projects do not pass a benefit/cost test but are at least marginally feasible, economically and financially, as determined by DNRC, do not have adverse impacts on instream flows, and are in the public interest. (Bd. Exh. 40, DEIS, pp. 135-152). Since the consumptive values of water for these projects are less than the instream values, these reservations should be junior in priority to the instream flow reservations requested by DFWP.

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1	BR-5	CS-61	CSI-21	GL-11	FEI-10
	BR-11	CS-251	CSI-22	GL-221	FE-431
2	BR-12	CS-271	CSI-41	CHI-51	FE-671
	BR-14	CS-331	CSI-51	CHI-53	FE-673
3	BR-106	CS-101	CSI-52	CH-21	FE-672
	BR-107	CS-102	CSI-101	CHI-10	FE-141
4	BR-108	CS-111	CSI-103	CHI-21	JB-281
	BR-109	CS-351	CSI-102	CHI-22	JB-231
5	BR-110	CS-541	CSI-11	CHI-30	JB-232
	LCI-10	CS-43	CSI-82	CHI-40	JBS-3
6	LC-210	CS-241	CSI-83	CH-201	TE-571
	LC-11	CSI-12	CSI-92	LI-161	VAS-1
7				LI-162	

765. BUREC's Virgelle project is economically feasible, and should be granted if conditioned to protect the instream flow rights of BLM for the Wild and Scenic portion of the Missouri River, and was second in priority to DFWP's reservation requests for reaches 4, 5, and 6 of the Missouri River. (Tr. Day 5, Mercer Cross, p. 115, D. Nelson Cross, p. 191).

766. The remaining projects do not pass the benefit/cost analysis, are not economically or financially feasible or will have adverse impacts on senior water rights or instream uses, and are not in the public interest.

E. Management Plan (Financial Feasibility) [ARM 36.16.107B(7)]

767. For the board to adopt an order reserving water, it must find the applicant has shown its capability to exercise reasonable diligence toward feasibly financing projects contemplated in the application and applying reserved water to beneficial use in accordance with a management plan.

BR-11	BR-11	BR-11
BR-12	BR-12	BR-12
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BR-14	BR-14	BR-14
BR-15	BR-15	BR-15
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BR-31	BR-31	BR-31
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BR-36	BR-36	BR-36
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1 768. The applications for the 18 conservation districts
2 contain discussion of a management plan and financial feasibility
3 of the various projects. (CD Exh. 2, p. 33).

4 769. However, none of the applications demonstrate with
5 specificity how the applicants will finance the projects
6 contemplated in the applications and apply the water with
7 reasonable diligence to a beneficial use. (Tr. Day 3, Perkins, p.
8 106; Tr. Day 3, Tubbs, p.257).

9 770. DNRC analyzed the financial feasibility of each project.
10 Financial feasibility is based on the percentage of 300 scenarios
11 of future crop prices for each project in which the direct net
12 returns from the project could repay a loan to finance all or half
13 the project costs within 15 years. (Bd. Exh. 23-C, Final EA,
14 Gallatin CD, pp. 13-14).

15 771. Projects rated "financially feasible" are those that are
16 likely to produce enough revenue to repay a 15-year loan covering
17 from half to all of the project's costs. Projects rated
18 "marginally feasible" financially pose a moderate risk that the
19 project will not produce enough new revenue to repay such a loan.
20 (Bd. Exh. 23-C, Final EA, Gallatin CD, pp. 13-14).

21 772. Projects identified in Finding of Fact No. 764 above are
22 at least marginally feasible financially.

23
24 F. Affects on Existing Water Rights [MCA § 85-2-316(9)(e); ARM
25 36.16.107B(8)]

26 773. While water may be physically available for a
27 reservation at the point of diversion, it may already be subject to
28

1 appropriation by a water user downstream. Existing water users in
2 the Missouri River Basin, such as irrigators, Montana Power Company
3 (MPC), BUREC, Bureau of Land Management (BLM), Indian Tribes, and
4 the Corp of Engineers already claim most of the flow in the
5 Missouri River and its tributaries. (Bd. Exh. 41, FEIS, p. S-3).

6 774. MPC's largest claimed water right is for 10,000 cfs at
7 Cochrane Dam. (MPC Exh. 3, Gruel Direct, p. 9).

8 775. If this water right is adjudicated as claimed, water
9 available for future consumptive uses would be severely limited.
10 Upstream from Cochrane Dam, water would not be available from
11 August through March, and would be available in only about one year
12 in ten during April through July and about five years in ten during
13 May and June. (Bd. Exh. 41, DEIS, pp. 57-59; MPC Exh. 3, Gruel
14 Direct, Att. C & D).

15 776. The United States, through BUREC, has substantial
16 claimed water rights at Canyon Ferry. (Bd. Exh. 40, DEIS, p. 59).

17 777. If MPC's and BUREC's water rights are adjudicated as
18 claimed, new consumptive users above Cochrane Dam and Canyon Ferry
19 Dam could divert water only during times of spill over the dams.
20 (MPC Exh. 3, Gruel Dir., p. 12; Tr. Day 4, D. Nelson Cross, p.
21 158).

22 778. Water is proposed to be diverted by irrigation projects
23 during times when water is not spilling at Canyon Ferry Dam or
24 Cochrane Dam. (Tr. Day 4, D. Nelson Cross, p. 158; Tr. Day 4,
25 Gruel Cross, p. 175).

26 779. The Jefferson Valley, Gallatin County and Broadwater
27 County conservation districts have failed to show there will be no
28

1 adverse impacts from development of projects on the senior water
2 rights of MPC and BUREC.

3 780. DFWP has an instream "Murphy Right" in the Madison River
4 from Ennis Lake to the mouth as follows:

5	1/1 to 5/31	1,200 cfs
6	6/1 to 6/30	1,500 cfs
7	7/1 to 7/15	1,423 cfs
8	7/16 to 12/31	1,300 cfs

9 (DFWP Exh. 3, Nelson Obj., p. 6).

10 781. Project GA-201 would divert 118 cfs for the project from
11 the Madison River below Ennis Lake. There are no return flows to
12 the Madison River from this project. (Bd. Exh. 23-C, Final EA,
13 Gallatin CD, p. 1).

14 782. To satisfy DFWP's August instream flow right of 1,300
15 cfs and supply 118 cfs for the project, a minimum of 1,418 cfs must
16 flow at the proposed diversion point. (DFWP Exh. 3, Nelson Obj.,
17 p. 7).

18 783. At times, summer streamflows in the Madison River below
19 Ennis Lake are already lower than DFWP's Murphy Right claim. (Bd.
20 Exh. 40, DEIS, p. 179).

21 784. Under present levels of irrigation development and
22 reservoir operations, 1,418 cfs equals about the 40 percentile
23 flow, meaning that it is available only in about four years out of
24 ten. (DFWP Exh. 3, Nelson Obj., p. 7).

25 785. Water cannot be diverted from the Madison River for
26 project GA-201 for all years without adversely affecting DFWP's
27 instream right. (DFWP Exh. 3, Nelson Obj., p. 8).

786. Water legally available for new consumptive use reservations will not be known until the statewide adjudication process is completed. (Bd. Exh. 40, DEIS, pg. S-3).

787. At times, summer streamflows are already lower than DFWP's Murphy Right claims on the following streams where reservations for new consumptive uses are proposed; Gallatin River from East Gallatin to mouth, Missouri River from Toston to Canyon Ferry Reservoir, and the Smith River from the Fort Logan Bridge to the confluence with Hound Creek. Projects on these streams will adversely impact DFWP's senior instream right. (Bd. Exh. 40, DEIS, p. 180).

788. The United States, through BLM, has a reserved water right claim for the Wild and Scenic portion of the Missouri River as follows:

STREAM REACH	TIME PERIOD	RECOMMENDED STREAMFLOW (cfs)
Fort Benton to Confluence of the Marias River	3/15-5/14	4,887
	5/15-5/18	6,390
	5/19-7/5	12,622
	7/6-7/15	6,390
	7/16-8/31	4,500
	9/1-11/15	4,480
	11/16-3/14	4,887
	16 days between 3/15 and 7/15	21,200
	(channel stability flows)	
Confluence of the Marias River to Confluence of the Judith River	3/15/-5/14	5,571
	5/15/-5/18	7,470
	5/19-7/5	14,000
	7/6-7/15	7,470
	7/16-8/31	5,400
	9/1-11/15	5,150
	11/16-3/14	4,305
	16 days between 3/15 and 7/15	22,600
	(channel stability flows)	

1	Confluence of Judith River	3/15-5/14	7,100
2	to Fred Robinson Bridge	5/15-5/18	8,300
3		5/19-7/5	15,187
4		7/6-7/15	7,470
5		7/16-8/31	5,400
6		9/1-11/15	5,150
7		11/16-3/14	4,305
8		16 days between	
9		3/15 and 7/15	22,600
10		(channel stability flows)	

(Bd. Exh. 40, DEIS, p. 66).

789. The Bureau of Reclamation's Virgelle project will adversely affect BLM's claimed reserved rights in the Wild and Scenic portion of the Missouri River unless the flows are supplemented by releases from Tiber Reservoir. (Bd. Exh. 36-C, BUREC Final EA, p. 2).

790. DFWP has requested instream reservations for fisheries and goose nesting in Missouri River reaches 4, 5 and 6 which are based on the same criteria as the BLM reserved claims. (Tr. Day 11, Gardner Cross, p. 105).

791. A reservation for the Virgelle project should be conditioned on maintenance of instream flows for the Wild and Scenic portion of the Missouri River. (Tr. Day 5, D. Nelson Cross, p. 188).

792. BUREC has acknowledged that any reservation granted to BUREC will be junior in priority to the instream flows in the Wild and Scenic portion of the Missouri River, and that BUREC will not violate BLM's claim. (BUREC Exh. 16, D. Nelson Reb., p. 1; Tr. Day 5, D. Nelson Cross, p. 188).

793. For these reasons, any reservation granted to BUREC should be junior in priority to a reservation to DFWP for reaches

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1 4, 5, and 6 of the Missouri River. (BUREC Exh. 16, D. Nelson Dir.,
2 p. 1; Tr. Day 5, D. Nelson Cross, p. 191).
3

4 **V. FINDINGS OF FACT: DEPARTMENT OF**
5 **HEALTH AND ENVIRONMENTAL SCIENCES**

6 794. DFWP does not propose any findings of fact for DHES's
7 instream flow reservation requests. DHES's reservation is not in
8 conflict with DFWP's reservation requests. To the extent they do
9 not conflict with DFWP's proposed findings of fact, DFWP adopts
10 DHES's Findings of Fact in support of its application.
11

12 **VI. FINDINGS OF FACT: BUREAU OF LAND**
13 **MANAGEMENT (BLM)**

14 795. DFWP does not propose any findings of fact for BLM
15 instream flow reservation requestS. BLM's reservation is not in
16 conflict with DFWP's reservation requests. To the extent they do
17 not conflict with DFWP's proposed Findings of Fact, DFWP adopts
18 BLM;s Findings of Fact in support of its application.
19

20 **VII. CONCLUSIONS OF LAW**

21 1. The DFWP is a state agency eligible under Section 85-2-
22 316(1), MCA to reserve waters to maintain a minimum flow of water
23 throughout the year or specified period of each year for the
24 purpose of protecting fish, wildlife, and recreational resources.

25 2. The applications for reserved water for minimum instream
26 flows made by DFWP on 281 stream or river segments, Bean Lake and
27 Antelope Butte Swamp meet the statutory criteria of Section 85-2-
28 316(4)(a), MCA for water reservations granted by the Board of

1 Natural Resources and Conservation (Board). DFWP has established
2 the purpose of the reservation, the need for the reservation, the
3 amount necessary for the purpose of the reservation, and that the
4 reservation is in the public interest for the minimum instream
5 reservations on all of the 281 stream reaches, one lake and one
6 swamp applied for by DFWP. The reservation requests meet the
7 statutory criteria as implemented in ARM 36.16.107B.

8 3. The DFWP has shown the capability to measure and protect
9 instream uses in accordance with the management plan in DFWP's
10 application.

11 4. The reservations requested by DFWP for minimum instream
12 flows are for a nonconsumptive use of the water without a diversion
13 or withdrawal from the stream or river segment. It is not
14 physically possible for these requested reservations to adversely
15 affect any existing water rights or beneficial water use permits,
16 whether the rights are consumptive or nonconsumptive uses of water
17 upstream or downstream from the stream or river segment.
18 Therefore, the nonconsumptive, minimum instream flow reservations
19 requested by DFWP do not adversely affect any water rights in
20 existence as required by. Section 85-2-316(9)(e), MCA and ARM
21 36.16.107B(8).

22 5. The reservations applied for by DFWP should be granted in
23 their entirety and should be given priority over any other
24 reservations granted, except for any reservations for municipal
25 purposes for which DFWP has withdrawn its objections and except for
26 the instream flows requested by the Department of Health and
27 Environmental Sciences (DHES) and by the United States Bureau of
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1 National Institute of Standards and Technology
2 The purpose of this report is to
3 present preliminary results of a
4 research project on the use of
5 computer-aided design (CAD) in
6 the design of mechanical systems.
7 This report is intended for
8 the use of the National Institute
9 of Standards and Technology
10 and its participating laboratories.
11 It is not intended for general
12 distribution.
13 The work described in this report
14 was performed by the National
15 Institute of Standards and
16 Technology, Gaithersburg, Maryland.
17 The work was performed under
18 the direction of the National
19 Institute of Standards and
20 Technology, Gaithersburg, Maryland.
21 The work was performed under
22 the direction of the National
23 Institute of Standards and
24 Technology, Gaithersburg, Maryland.
25 The work was performed under
26 the direction of the National
27 Institute of Standards and
28 Technology, Gaithersburg, Maryland.

1 Land Management (BLM), which are complementary with DFWP's instream
2 requests.

3 6. The instream reservations applied for by DFWP, DHES and
4 BLM are by their nature complementary and will use the same water
5 where they overlap. These instream requests do not compete with
6 each other for water.

7 7. The statutory limit of Section 85-2-316(6), MCA
8 restricting instream flow reservations to 50% of the average annual
9 flow of record on gauged streams is applied to the whole year
10 rather than by month or calendar date.

11 8. Except as noted below, the reservations applied for by 18
12 conservation districts for new and supplemental irrigation projects
13 do not meet the statutory criteria of Section 85-2-316(4), MCA and
14 the implementing rule, ARM 36.16.107B. Specifically, the
15 conservation districts have not shown that the reservations are in
16 the public interest.

17 9. Except as noted below, the reservations applied for by the
18 18 conservation districts are for consumptive uses of water that
19 will adversely affect claimed existing consumptive and
20 nonconsumptive water rights, including water rights for hydropower
21 generation, and beneficial water use permits. Therefore, the Board
22 cannot grant reservations as applied for by the conservation
23 districts because Section 85-2-316(9)(e), MCA and ARM 36.16.10B(8)
24 require that reservations adopted by the Board must not adversely
25 affect any water rights in existence at the time of adoption.

26 10. Except as noted below, the conservation districts have
27 not shown, as required by ARM 36.16.107B(7), the capability to
28

1 exercise reasonable diligence toward feasibly financing any of the
2 projects for which water reservations have been requested or toward
3 applying the water to beneficial use in accordance with a
4 management plan.

5 11. The requested reservations by 18 conservation districts
6 should be denied or, if granted, should be given priorities
7 subsequent to the minimum instream flow reservations granted to
8 DFWP. Only those proposed irrigation projects that are at least
9 marginally feasible, and whose potential competition with the
10 instream flow reservations of DFWP and DHES is not substantial, can
11 be granted as in the public interest, provided they are junior to
12 instream flow reservations.

13 12. The city of Bozeman, in its application for a municipal
14 reservation, has not shown the need for the reservation, or the
15 amount of water necessary for the reservation, as required by
16 Section 85-2-316(4)(a), MCA or ARM 36.16.107B(2) and (3).
17 Therefore, the reservation should be conditioned to meet these
18 criteria.

19 13. The United States Bureau of Reclamation (BUREC), in its
20 application to divert water from the Missouri near Virgelle for
21 irrigation purposes in the Milk River basin, has not shown that the
22 reservation is in the public interest as required by Section 85-2-
23 316(4)(a), MCA or ARM 36.16.107B(4). The BUREC has not shown, as
24 required by ARM 36.16.107B(7), its capability to exercise
25 reasonable diligence toward feasibly financing this project or
26 toward applying reserved water to beneficial use in accordance with
27 a management plan. Therefore, the reservation should be given a
28



1 priority subsequent to the minimum instream flow reservations
2 granted to DFWP and conditioned subject to water quality standards
3 to these requirements.

4 14. The expected benefits of reserving and applying to
5 immediate use the minimum instream flows applied for by DFWP exceed
6 the expected costs, where the benefits and costs, including non-
7 market benefits and costs, have been quantified and valued as
8 required by ARM 36.16.107B(4)(a) and the benefits and costs that
9 are not reasonably quantifiable have been considered.

10 15. The net benefits of granting minimum instream flow
11 reservations to DFWP exceed the net benefits of not granting
12 minimum instream flow reservations to DFWP.

13 16. There are no reasonable alternatives to the proposed
14 instream reservations of DFWP with greater net benefits.

15 17. If water is not reserved for the minimum instream flows
16 requested by DFWP, an irretrievable loss of natural resources is
17 likely to incrementally occur.

18 18. The expected benefits of granting the reservations
19 requested by the conservation districts and BUREC exceed the
20 expected costs, where the benefits and costs, including non-market
21 benefits and costs, have been quantified and valued as required by
22 ARM 36.16.107B(4)(a) and the benefits and costs that are not
23 reasonably quantifiable have been considered.

24 19. The net benefits of reservations requested by the
25 conservation districts and BUREC are not greater than the net
26 benefits of not granting these reservations.



1 20. There are reasonable alternatives to the proposed
2 reservations by the conservation districts, BUREC, and the city of
3 Bozeman with greater net benefits.

4 21. If water is not reserved for the purposes applied for by
5 the conservation districts, BUREC and the city of Bozeman, there
6 will not be any irretrievable loss of a resource development
7 opportunity.

8 22. The reservation requested by teh city of Bozeman may be
9 granted if it is conditioned to require a future showing of the
10 need for the amount requested and mitigation for resource losses.

11 23. DFWP has provided an analysis of the physical
12 availability of flows as required by ARM 36.16.105B(2).

13 24. DFWP has shown that its reservation requests are needed,
14 considering that DFWP may not be eligible to apply for a water use
15 permit, by demonstrating that the water resource values of
16 fisheries, wildlife and recreation warrant reserving the minimum
17 instream flows requested by DFWP. The instream flows meet the
18 requirement of Section 85-2-316(4)(a)(ii), MCA and ARM
19 36.16.107B(2)(b).

20 25. The conservation districts, the BUREC and the city of
21 Bozeman have not demonstrated either that there is a reasonable
22 likelihood that future instate or out-of-state competing water
23 uses, except competing reservation applications, will consume,
24 degrade, or otherwise affect the water available for their
25 proposed projects or that there are constraints restricting the
26 conservation districts, the BUREC or the City of Bozeman from
27 perfecting water permits for the purposes of their proposed
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1 reservations, as required by Section 85-2-316(4)(a)(ii), MCA and
2 ARM 36.16.107B(2)(a) and (c).

3 26. The methodologies and assumptions used by DFWP to
4 determine the amounts needed for minimum instream flows are
5 accurate and suitable, as required by Section 85-2-316(4)(a)(iii),
6 MCA and ARM 36.16.107B(3)(a).

7 27. The amounts requested by DFWP on gauged streams do not
8 exceed the limit of 50% of the average annual flow of record
9 provided by Section 85-2-316(6), MCA.

10 28. DFWP has shown reasonable diligence will be applied, as
11 required by ARM 36.16.107B(7), toward protecting instream uses in
12 accordance with a management plan.

13 29. The projects proposed by the conservation districts and
14 BUREC for the consumptive use of water will adversely affect
15 claimed existing water rights, including downstream rights for
16 hydropower generation, in contravention of Section 85-2-316(9)(e),
17 MCA and ARM 36.16.107B(8).

18 19 VIII. ORDER

20 The Board, having made the foregoing Findings of Fact and
21 Conclusions of Law, hereby makes its Order granting, denying or
22 conditioning reservations in the Missouri River basin above Fort
23 Peck Dam:

24 25 Municipal Reservations:

26 1. The following municipalities, pursuant to their respective
27 applications, are granted reservations of water allowing the
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appropriation of not more than the volume of water per year, in acre feet, and with an average flow rate, in cubic feet per second, from the named water source, as indicated for each municipality:

		<u>cfs</u>	<u>acre-feet/year</u>
Belgrade	Wells (2)	3.56	645
Chester	Marias River	1.00	435
Conrad	Lake Frances	5.45	1,322
Cut Bank	Cut Bank Cr.	3.37	890
Dillon	Well	1.11	202
East Helena	McClellan Cr. and wells	0.93	258
Fairfield	Wells (2)	0.34	100
Fort Benton			
Municipal	Missouri River	0.76	89
Parks			
Irrigation	Missouri River	0.67	35
Great Falls			
Municipal	Missouri River	28.16	10,642
Parks			
Irrigation	Missouri River	4.45	233.5
Parks			
Irrigation	Sun River	4.45	233.5
Helena	Wells (6-8)	16.4	7,071
Lewistown	Big Spring Cr.	3.57	2,966
Power	Muddy Cr.	0.27	62
Shelby	Wells (4-8)	1.83	302
Three Forks	Wells (2)	0.45	81
W. Yellowstone	Whiskey Spring	3.53	2,550
Winifred	Well	0.26	60

2. The city of Choteau has withdrawn its application for a reservation of water, and its application is therefor denied.

3. The applicant, city of Bozeman, pursuant to its application, is granted a reservation of water allowing the appropriation of not more than 6,000 acre-feet per year, with a flow rate of 327 cfs, from Sourdough (Bozeman) Creek, to be used for municipal water supply, but subject to the following conditions:

a. The city of Bozeman shall attain a per capita consumption rate of 250 gallons per day prior to undertaking the

1 construction of a storage facility on Sourdough (Bozeman) Creek and
2 storing water for beneficial use.

3 b. The city of Bozeman shall accept and have firm plans
4 to use all water available to it from the enlargement of Hyalite
5 Reservoir, which is expected to provide an addition of 2.9 cfs
6 (2,097 acre-feet per year) to the water supplies of the city, prior
7 to beneficially using water reserved to it in this Order.

8 c. The city of Bozeman in its operation of the storage
9 facility on Sourdough (Bozeman) Creek shall regulate flow releases
10 to provide minimum fishery maintenance flows in Sourdough Creek
11 downstream from the city's diversion point.

12 d. The city of Bozeman must demonstrate to the
13 satisfaction of the Board, after a hearing, that the city has met
14 conditions "a" and "b" and will meet condition "c".

15 4. The reservations for the above-named municipalities shall
16 have priority over any other reservations granted by the Board in
17 this Order.

18 DFWP Instream Reservations

19 5. The Applicant, Montana Department of Fish, Wildlife and
20 Parks, is granted instream flow reservations in the streams and in
21 the amounts and for the time periods set forth in Table 12 attached
22 hereto and incorporated herein by this reference.

23 6. The reservations for DFWP shall be second in priority to
24 the municipal reservations granted in the Order, shall be equal in
25 priority to the instream flow reservations granted to the Montana
26 Department of Health and Environmental Sciences (MDHES) and United
27 States Department of Interior, Bureau of Land Management (BLM) and
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from DEIS, Table 3-2, Page 23

Table 3-2. DFWP Instream flow requests

HEADWATERS SUBBASIN

BIG HOLE RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	AMOUNT REQUESTED (af/yr)
American Creek	Headwaters to mouth	Jan 1 - Dec 31	2.8	2,027
Bear Creek	Headwaters to mouth	Jan 1 - Dec 31	2.8	2,027
Big Hole River #1	Warm Springs Creek to Pintlar Creek	Jan 1 - Dec 31	160	115,835
Big Hole River #2	Pintlar Creek to the old Divide Dam	Jan 1 - Dec 31	800	579,173
Big Hole River #3	Old Divide Dam to mouth	Jan 1 - Dec 31	650	470,578
Big Lake Creek	Twin Lakes outlet to mouth	Jan 1 - Dec 31	4.7	3,403
Birch Creek	Mule Creek to mouth	Jan 1 - Dec 31	10	7,240
Bryant Creek	Headwaters to mouth	Jan 1 - Dec 31	1.4	1,014
California Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136
Camp Creek	Headwaters to mouth	Jan 1 - Dec 31	5	3,620
Canyon Creek	Canyon Lake to mouth	Jan 1 - Dec 31	5	3,620
Corral Creek	Headwaters to mouth	Jan 1 - Dec 31	1	724
Deep Creek	Sevenmile and Tenmile to mouth	Jan 1 - Dec 31	18	13,031
Delano Creek	Headwaters to mouth	Jan 1 - Dec 31	0.3	217
Divide Creek	North and East forks to mouth	Jan 1 - Dec 31	3	2,172
Fishtrap Creek	West and Middle forks to mouth	Jan 1 - Dec 31	10	7,240
Francis Creek	Sand Creek to mouth	Jan 1 - Dec 31	4	2,896
French Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344
Governor Creek	Headwaters to mouth	Jan 1 - Dec 31	4	2,896
Jacobsen Creek	Tahepia Lake to mouth	Jan 1 - Dec 31	14	10,136
Jerry Creek	Headwaters to mouth	Jan 1 - Dec 31	7	5,068
Johnson Creek	Schultz Creek to Forest Service boundary	Jan 1 - Dec 31	13	9,412
Joseph Creek	Anderson Creek to mouth	Jan 1 - Dec 31	5	3,620
LaMarche Creek	West and Middle forks to mouth	Jan 1 - Dec 31	11	7,964
Miner Creek	Upper Miner Lakes to mouth	Jan 1 - Dec 31	9	6,516
Moose Creek	Headwaters to mouth	Jan 1 - Dec 31	9	6,516
Mussigbrod Creek	Hell Roaring Creek to Forest Service boundary	Jan 1 - Dec 31	10	7,240
NF Big Hole River	Ruby and Trail creeks to mouth	Jan 1 - Dec 31	30	21,719
Oregon Creek	Headwaters to mouth	Jan 1 - Dec 31	0.3	217
Pattengail Creek	Sand Lake to mouth	Jan 1 - Dec 31	12	8,588
Pintlar Creek	Oreamnos Lake to mouth	Jan 1 - Dec 31	10	7,240
Rock Creek	Beaverhead National Forest boundary to mouth	Jan 1 - Dec 31	5	3,620
Ruby Creek	Pioneer and WF Ruby creeks to mouth	Jan 1 - Dec 31	4	2,896
Sevenmile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.8	1,303
Seymour Creek	Upper Seymour Lake to mouth	Jan 1 - Dec 31	13	9,412
Sixmile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.6	1,158
SF Big Hole River	Skinner Lake to mouth	Jan 1 - Dec 31	22	15,927
Steel Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344
Sullivan Creek	Headwaters to mouth	Jan 1 - Dec 31	4	2,896
Swamp Creek	Yank Swamp to mouth	Jan 1 - Dec 31	8	5,792
Tenmile Creek	Tenmile Lakes to mouth	Jan 1 - Dec 31	3.8	2,751
Trail Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136
Trapper Creek	Trapper Lake to mouth	Jan 1 - Dec 31	3.2	2,317
Twelvemile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.2	869
Warm Springs Creek	West and East forks to mouth	Jan 1 - Dec 31	20	14,479
Willow Creek	Tendoy Lake to mouth	Jan 1 - Dec 31	16	11,583
Wise River	Mono and Jacobson creeks to mouth	Jan 1 - Dec 31	35	25,339
Wyman Creek	Headwaters to mouth	Jan 1 - Dec 31	7	5,068

GALLATIN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	AMOUNT REQUESTED (af/yr)
Baker Creek	Heeb Lane Bridge to mouth	Jan 1 - Dec 31	14	10,136
Ben Hart Creek	Headwaters to mouth	Jan 1 - Dec 31	29	20,995
Big Bear Creek	Headwaters to mouth	Jan 1 - Dec 31	2	1,448
Bridger Creek	Headwaters to mouth	Jan 1 - Dec 31	36.6	26,497
Cache Creek	Headwaters to mouth	Jan 1 - Dec 31	2.6	1,882
EF Hyalite Creek	Heather Lake to Hyalite Reservoir	Jan 1 - Dec 31	7	5,068
East Gallatin River #1	Rocky and Sourdough cks to Bozeman STP outlet	Jan 1 - Dec 31	121.3	87,817
East Gallatin River #2	Bozeman STP outlet to Thompson Spring Creek	Jan 1 - Dec 31	90	65,157
East Gallatin River #3	Thompson Spring Creek to mouth	Jan 1 - Dec 31	170	123,074

Ck - Creek EF - East Fork R - River SF - South Fork STP - sewage treatment plant WF - West Fork

Table 12 (continued)

24

Gallatin River Drainage (continued)

Gallatin River #1	Yellowstone NP boundary to WF Gallatin River	Jan 1 - Dec 31	170	123,074
Gallatin River #2	WF Gallatin River to East Gallatin River	Jan 1 - Dec 31	400	289,587
Gallatin River #3	East Gallatin River to mouth	Jan 1 - Dec 31	1,000	723,967
Hell Roaring Creek	NF Hell Roaring Creek to mouth	Jan 1 - Dec 31	16	11,583
Hyalite (Middle) Creek #1	Middle Creek Dam to Middle Creek Ditch intake	Jan 1 - Dec 31	28	20,271
Hyalite (Middle) Creek #2	I-90 bridge near Belgrade to mouth	Jan 1 - Dec 31	16	11,583
MF of the WF Gallatin R.	Headwaters to NF of the WF Gallatin River	Jan 1 - Dec 31	3	2,172
Porcupine Creek	NF Porcupine Creek to mouth	Jan 1 - Dec 31	4.5	3,258
Reese Creek	Bill Smith Creek to mouth	Jan 1 - Dec 31	5	3,620
Rocky Creek	Jackson Creek to Sourdough Creek	Jan 1 - Dec 31	51	36,922
Sourdough (Bozeman) Ck.	Mystic Reservoir to mouth	Jan 1 - Dec 31	35.9	25,990
South Cottonwood Creek	Jim Creek to Hart Ditch headgate	Jan 1 - Dec 31	14	10,136
SF Spanish Creek	Falls Creek to mouth	Jan 1 - Dec 31	15	10,859
SF of the WF Gallatin R.	Headwaters to mouth	Jan 1 - Dec 31	5	3,620
Spanish Creek	North and South forks to mouth	Jan 1 - Dec 31	70	50,678
Squaw Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,588
Taylor Fork	Tumbledown Creek to mouth of Gallatin River	Jan 1 - Dec 31	36	26,063
Thompson Spring Creek	County road crossing in T1N R5E Sec 30 to mouth	Jan 1 - Dec 31	29	20,995
WF Gallatin River	Middle and North forks to mouth	Jan 1 - Dec 31	26	18,823
WF Hyalite Creek	Hyalite Lake to Hyalite Reservoir	Jan 1 - Dec 31	12	8,688

JEFFERSON AND BOULDER RIVER DRAINAGES

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(a/yr)
Boulder River #1	West and South forks to High Ore Creek	Jan 1 - Dec 31	20	14,479
Boulder River #2	High Ore Creek to Cold Spring	Jan 1 - Dec 31	24	17,375
Boulder River #3	Cold Spring to mouth	Jan 1 - Dec 31	47	34,026
Halfway Creek	Headwaters to canyon	Jan 1 - Dec 31	1.9	1,376
Hells Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	3.6	2,606
Jefferson River	Headwaters to Madison River	Jan 1 - Dec 31	1,100	796,363
Little Boulder River	Moose Creek to mouth	Jan 1 - Dec 31	7	5,068
North Willow Creek	<i>to p</i> Hollow Lake Lake to mouth	Jan 1 - Dec 31	7	5,068
South Boulder River	Curly Creek to mouth	Jan 1 - Dec 31	12	8,688
South Willow Creek	Granite Lake to mouth	Jan 1 - Dec 31	14	10,136
Whitetail Creek	Whitetail Reservoir to mouth	Jan 1 - Dec 31	3	2,172
Willow Creek	North and South Willow creeks to mouth	Jan 1 - Dec 31	14	10,136
Willow Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	9.2	6,660

MADISON RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(a/yr)
Antelope Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136
Beaver Creek	Wyethia Creek to Earthquake Lake	Jan 1 - Dec 31	937	42,280
Black Sand Spring Creek	Black Sand Spring to SF Madison River	Jan 1 - Dec 31	18.7	13,538
Blaine Spring Creek	Ennis National Fish Hatchery to mouth	Jan 1 - Dec 31	23	16,651
Cabin Creek	Gully Creek to Madison River	Jan 1 - Dec 31	585	28,741
Cherry Creek	Headwaters to mouth	Jan 1 - Dec 31	15	10,859
Cougar Creek	Yellowstone NP boundary to mouth	Jan 1 - Dec 31	24	17,375
Duck Creek	Yellowstone NP boundary to Hebgen Reservoir	Jan 1 - Dec 31	23	16,651
Elk River	Headwaters to mouth	Jan 1 - Dec 31	28	20,271
Grayling Creek	Yellowstone NP boundary to Hebgen Reservoir	Jan 1 - Dec 31	34	24,615
Hot Springs Creek	North and Middle forks to mouth	Jan 1 - Dec 31	5.5	3,982
Indian Creek	Raw Liver Creek to mouth	Jan 1 - Dec 31	48	34,750
Jack Creek	Lone Creek to mouth	Jan 1 - Dec 31	28	20,271
Madison River #1	Yellowstone NP boundary to Hebgen Reservoir	Jan 1 - Dec 31	500	361,983
Madison River #2	Hebgen Dam to West Fork	Jan 1 - Dec 31	800	579,173
Madison River #3	West Fork to Ennis Reservoir	Jan 1 - Dec 31	1,000	723,967
Madison River #4	Ennis Dam to mouth	Jan 1 - Dec 31	1,300	941,157
Moore Creek	Fletcher Creek to mouth	Jan 1 - Dec 31	1.4	1,014
North Meadow Creek	Headwaters to mouth	Jan 1 - Dec 31	18	13,031
O'Dell Creek	Headwaters to mouth	Jan 1 - Dec 31	98	70,949
Red Canyon Creek	Headwaters to Hebgen Reservoir	Jan 1 - Dec 31	2.9	2,100
Ruby Creek	Beartrap Canyon to mouth	Jan 1 - Dec 31	18	13,031
SF Madison River	Dry Canyon to Hebgen Reservoir	Jan 1 - Dec 31	92	66,605
Squaw Creek	North Fork to mouth	Jan 1 - Dec 31	14	10,136
Standard Creek	Headwaters to mouth	Jan 1 - Dec 31	10	7,240
Trapper Creek	Headwaters to Hebgen Reservoir	Jan 1 - Dec 31	3.2	2,317
Watkins Creek	Coffin Creek to Hebgen Reservoir	Jan 1 - Dec 31	5.5	3,982
WF Madison River	Fox Creek to mouth	Jan 1 - Dec 31	957	66,533

Ck - Creek MF - Middle Fork NF - North Fork NP - National Park R - River SF - South Fork WF - West Fork

Table 12 (continued)

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RED ROCK-BEAVERHEAD DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(a/yr)
Bear Creek	Headwaters to BLM boundary	Jan 1 - Dec 31	6.5	4,706
Beaverhead River #1	Clark Canyon to East Bench Div Dam at Barretts	Jan 1 - Dec 31	200	144,793
Beaverhead River #2	East Bench Diversion Dam at Barretts to mouth	Jan 1 - Dec 31	200	144,793
Big Sheep Creek	Cabin and Nicholia creeks to mouth	Jan 1 - Dec 31	48	34,750
Black Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	2.5	1,810
Blacktail Deer Creek	MF and WF to County Rd @ T8S R8W Secs 20 & 29	Jan 1 - Dec 31	42	30,407
Bloody Dick Creek	Swift Lake outlet to mouth	Jan 1 - Dec 31	20	14,479
Browns Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	2.3	1,665
Cabin Creek	Headwaters to mouth	Jan 1 - Dec 31	0.4	290
Corral Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344
Deadman Creek	Deadman Lake to mouth	Jan 1 - Dec 31	4.5	3,258
EF Blacktail Deer Creek	Headwaters to mouth	Jan 1 - Dec 31	18	13,031
EF Clover Creek	Headwaters to mouth	Jan 1 - Dec 31	4.4	3,185
EF Dyce Creek	Headwaters to mouth	Jan 1 - Dec 31	1.4	1,014
Frying Pan Creek	Headwaters to mouth	Jan 1 - Dec 31	1.6	1,158
Grasshopper Creek	Blue Creek to mouth	Jan 1 - Dec 31	30	21,719
Hell Roaring Creek	Headwaters to mouth	Jan 1 - Dec 31	15	10,859
Horse Prairie Creek	Headwaters to mouth	Jan 1 - Dec 31	36	26,063
Indian Creek	Headwaters to mouth	Jan 1 - Dec 31	0.2	145
Jones Creek	Headwaters to Lakeview Road crossing	Jan 1 - Dec 31	1.9	1,376
Long Creek	Jones Creek to mouth	Jan 1 - Dec 31	3.4	2,461
Medicine Lodge Creek	Bear Canyon to mouth	Jan 1 - Dec 31	10	7,240
Narrows Creek	Spring in T13S R1E Sec18A to Elk Lake	May 1 - July 15	1.2	869
		July 16 - April 30	0.5	362
Odell Creek	Headwaters to Lower Red Rock Lake	Jan 1 - Dec 31	11	7,964
Peet Creek	Headwaters to reservoir in T14S R4W Sec34A	Jan 1 - Dec 31	0.9	652
Poindexter Slough	Springs & canal T8S R9W Sec3, SW to Beaverhead	Jan 1 - Dec 31	57.9	41,918
Rape Creek	Headwaters to reservoir in T10S R13W Sec4	Jan 1 - Dec 31	0.4	290
Red Rock Creek	Headwaters to Upper Red Rock Lake	Jan 1 - Dec 31	15	10,859
Red Rock River #1	Dam at Lower Red Rock Lake to Lima Reservoir	Jan 1 - Dec 31	55	39,818
Red Rock River #2	Lima Dam to Clark Canyon Reservoir	Jan 1 - Dec 31	60	43,438
Reservoir Creek	Headwaters to mouth	Jan 1 - Dec 31	1.5	1,086
Shenon Creek	Headwaters to BLM boundary in T10S R14W Sec25	Jan 1 - Dec 31	0.4	290
Simpson Creek	Headwaters to mouth	Jan 1 - Dec 31	0.7	507
Tom Creek	Headwaters to Upper Red Rock Lake	Jan 1 - Dec 31	1.4	1,014
Trapper Creek	Headwaters to mouth	Jan 1 - Dec 31	0.7	507
WF Blacktail Deer Creek	Grays and South forks to mouth	Jan 1 - Dec 31	3	2,172
WF Dyce Creek	Headwaters to mouth	Jan 1 - Dec 31	0.7	507

RUBY RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(a/yr)
Coal Creek	Headwaters to mouth	Jan 1 - Dec 31	3.6	2,606
Cottonwood Creek	Geyser Creek to mouth	Jan 1 - Dec 31	4	2,896
EF Ruby River	Headwaters to mouth	Jan 1 - Dec 31	3	2,172
MF Ruby River	Divide Creek to mouth	Jan 1 - Dec 31	5	3,620
Mill Creek	Outlet of Branham Lake to mouth	Jan 1 - Dec 31	10	7,240
NF Greenhorn Creek	Headwaters to mouth	Jan 1 - Dec 31	3.5	2,534
Ruby River #1	East, Middle, and West forks to Ruby Reservoir	Jan 1 - Dec 31	102	73,845
Ruby River #2	Ruby Dam to mouth	Jan 1 - Dec 31	40	28,959
Warm Springs Creek	<i>Romy</i> Box Lake outlet to mouth	Jan 1 - Dec 31	48.5	35,112
WF Ruby River	Headwaters to mouth	Jan 1 - Dec 31	3.0	2,172
Wisconsin Creek	Crystal Lake outlet to mouth	Jan 1 - Dec 31	12	8,688

UPPER MISSOURI SUBBASIN

UPPER MISSOURI RIVER AND TRIBUTARIES

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(a/yr)
Avalanche Creek	Cooney Gulch to Canyon Ferry Reservoir	Jan 1 - Dec 31	5	3,620
Beaver Creek	Headwaters in Elkhorn Mts to Canyon Ferry Reservoir	Jan 1 - Dec 31	2.8	2,027
Beaver Creek	Headwaters in Big Belt Mts to mouth	Jan 1 - Dec 31	10.0	7,240
Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	10.0	7,240
Confederate Gulch	Debauch Gulch to mouth	Jan 1 - Dec 31	5	3,620
Cottonwood Creek	Headwaters to mouth	Jan 1 - Dec 31	1.0	724
Crow Creek	Tizer and Wilson Creeks to Williams Ditch intake	Jan 1 - Dec 31	11	7,964
Deep Creek	Castle Fork to Missouri River	Jan 1 - Dec 31	9	6,516

EF - East Fork MF - Middle Fork NF - North Fork WF - West Fork

Table 12 (continued)

Upper Missouri River and Tributaries (continued)

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Dry Creek	Headwaters to Broadwater Missouri Canal	Jan 1 - Dec 31	1.8	1,303	
Duck Creek	Headwaters to Canyon Ferry Res.	Jan 1 - Dec 31	8	5,792	
Little Prickly Pear Ck. #1	Canyon Creek to Clark Creek	Jan 1 - Dec 31	22	15,927	15,927
Little Prickly Pear Ck. #2	Clark Creek to mouth	Jan 1 - Dec 31	70	50,678	50,678
Lyons Creek	Headwaters to mouth	Jan 1 - Dec 31	10.0	7,240	7,240
McGuire Creek	Headwaters to mouth	May 1 - Nov 30	8.3	3,523	
		Dec 1 - Apr 30	4.7	1,408	4,931
Missouri River #1	Jefferson and Madison rivers to Canyon Ferry Res.	Jan 1 - Dec 31	2,400	1,737,520	1,737,520
Missouri River #2	Hauser Dam to Holter Reservoir	Oct 15 - Dec 15	4,878	599,873	
		Dec 16 - Mar 15	3,000	535,537	
		Mar 16 - Apr 30	5,316	485,030	
		May 1 - June 30	7,890	954,624	
		July 1 - Oct 14	3,500	735,867	3,310,931
Missouri River #3	Holter Dam to Great Falls	May 19 - July 5	6,398	609,132	
		July 6 - May 18	4,100	2,577,916	3,187,048
Prickly Pear Creek #1	Rabbit Gulch to Hwy 12 bridge in East Helena	Jan 1 - Dec 31	22	15,927	15,927
Prickly Pear Creek #2	Hwy 12 bridge in East Helena to Lake Helena	Jan 1 - Dec 31	30	21,719	21,719
Sevenmile Creek	Greenhorn Creek and Skelly Gulch to mouth	Jan 1 - Dec 31	1.0	724	724
Silver Creek	Helena Valley Irrigation Canal to mouth	May 1 - Nov 30	13.0	5,518	
		Dec 1 - Apr 30	5.4	1,617	7,135
Sixteenmile Creek	Billy Creek to mouth	Jan 1 - Dec 31	20	14,479	14,479
Spokane Creek	Helena Valley Irr. Canal to mouth	May 1 - Nov 30	4.0	1,698	
		Dec 1 - Apr 30	3.0	898	2,596
Stickney Creek	North and South forks to mouth	Apr 1 - Apr 30	7	417	
		May 1 - May 31	34	2,091	
		June 1 - June 30	35	2,083	
		July 1 - July 31	7	430	5,021
Tenmile Creek	Headwaters to mouth	Jan 1 - Dec 31	12.0	8,688	8,688
Trout Creek	Springs near Vigilante Campground to mouth	Jan 1 - Dec 31	15.0	10,860	10,860
Virginia Creek	Headwaters to mouth	Jan 1 - Dec 31	6.0	4,344	4,344
Wegner Creek	Headwaters to mouth	Apr 1 - Apr 30	8	476	
		May 1 - May 31	41	2,521	
		June 1 - June 30	38	2,261	
		July 1 - July 31	8	492	5,750
Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3.5	2,534	2,534
Wolf Creek	Headwaters to mouth	Jan 1 - Dec 31	7.0	5,068	5,068

DEARBORN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	110	79,636	79,636
Flat Creek	Headwaters to mouth	Jan 1 - Dec 31	7.5	5,430	5,430
MF Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	9.5	6,878	6,878
Sheep Creek	Headwaters of South Fork to mouth	Jan 1 - Dec 31	22	15,927	15,927
SF Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	11.5	8,326	8,326

SMITH RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Big Birch Creek	Headwaters to mouth	Jan 1 - Dec 31	11	7,964	7,964
Eagle Creek	Headwaters to mouth	Jan 1 - Dec 31	2.5	1,810	1,810
Hound Creek	EF Hound Creek and Middle Creek to mouth	Jan 1 - Dec 31	35	25,339	25,339
Newlan Creek	Headwaters to mouth	Jan 1 - Dec 31	3.8	2,751	2,751
NF Deep Creek	Headwaters to rock cascades	Jan 1 - Dec 31	1.0	724	724
NF Smith River	Headwaters to mouth	Jan 1 - Dec 31	9	6,516	6,516
Rock Creek	Headwaters to mouth	Jan 1 - Dec 31	11	7,964	7,964
Sheep Creek	Headwaters to mouth	Jan 1 - Dec 31	35	25,339	25,339
Smith River #1	North and South Forks Sheep Creek	Jan 1 - Dec 31	90	65,157	65,157

EF - East Fork Irr. - Irrigation MF - Middle Fork Res. - Reservoir SF - South Fork

Table 12 (continued)

Smith River Drainage (continued)

Smith River #2	Sheep Creek to Hound Creek	Jan 1 - Dec 31	150	108,595	108,595
Smith River #3	Hound Creek to mouth	Jan 1 - Dec 31	80	57,917	57,917
SF Smith River	Headwaters to mouth	Jan 1 - Dec 31	7	5,068	5,068
Tenderfoot Creek	Headwaters to mouth	Jan 1 - Dec 31	15	10,859	10,859

SUN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Elk Creek	Headwaters to mouth	Jan 1 - Dec 31	16	11,583	11,583
Ford Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
NF Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3.0	2,172	2,172
Sun River #1	Diversion Dam to Elk Creek	Jan 1 - Dec 31	100	72,397	72,397
Sun River #2	Elk Creek to mouth	Jan 1 - Dec 31	130	94,116	94,116
Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3	2,172	2,172

BELT CREEK DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Belt Creek #1	Headwaters to Big Otter Creek	Jan 1 - Dec 31	90	65,157	65,157
Belt Creek #2	Big Otter Creek to Missouri River	Jan 1 - Dec 31	35	25,339	25,339
Big Otter Creek	Whiskey Spring Coulee to Belt Creek	Jan 1 - Dec 31	5	3,620	3,620
Dry Fork Belt Creek	Galena and Old Park Creek to Belt Creek	Jan 1 - Dec 31	7	5,068	5,068
Logging Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	6	4,344	4,344
Pilgrim Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	8	5,792	5,792
Tillinghast Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	5.5	3,982	3,982

MIDDLE MISSOURI SUBBASIN

MIDDLE MISSOURI RIVER AND TRIBUTARIES

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Cow Creek	NF and SF to County bridge	Jan 1 - Dec 31	4.5	3,258	3,258
Highwood Creek	Headwaters to Hwy 228 Bridge at Highwood	Jan 1 - Dec 31	10	7,240	7,240
Missouri River #4	Great Falls to Maris River	Mar 15 - May 18	4,887	630,059	
		May 19 - July 5	11,284	1,074,311	
		July 6 - Aug 31	4,500	508,760	
		Sep 1 - Mar 14	3,700	1,431,075	4,324,205
		Mar 15 - May 18	5,571	718,244	
Missouri River #5	Maris River to Judith River	May 19 - July 5	14,000	1,332,892	
		July 6 - Aug 31	5,400	610,512	
		Sep 1 - Mar 14	4,300	1,663,140	4,324,788
		Mar 15 - May 18	7,100	915,371	
		May 19 - July 5	15,302	1,456,851	
Missouri River #6	Judith River to upper end of Fort Peck Reservoir	July 6 - Aug 31	5,800	655,735	
		Sep 1 - Mar 14	4,700	1,817,850	4,845,807
		Jan 1 - Dec 31	7	5,068	5,068
Shonkin Creek	Forest boundary to town of Shonkin	Jan 1 - Dec 31	7	5,068	5,068

FORT PECK RESERVOIR TRIBUTARIES

Big Dry Creek	Hwy 200 bridge to mouth	Mar 15 - Mar 31	300	9,521	
		Apr 1 - Apr 30	100	5,950	
		May 1 - May 31	35	2,152	
		June 1 - Oct 31	5.5	1,669	19,292
		Mar 15 - Mar 31	110	3,491	
Little Dry Creek	Whiteside ranch house to Big Dry Creek	Apr 1 - Apr 30	42	2,499	
		May 1 - May 31	17	1,045	
		June 1 - Oct 31	3.5	1,062	8,097

JUDITH RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(af)	(af/yr)
Beaver Creek	West Fork to Cottonwood Creek	Jan 1 - Dec 31	5	3,620	3,620
Big Spring Creek #1	Fish hatchery to Cottonwood Creek	Jan 1 - Dec 31	110	79,636	79,636
Big Spring Creek #2	Cottonwood Creek to mouth	Jan 1 - Dec 31	100	72,397	72,397
Cottonwood Creek	Spring Branch of Cottonwood Ck. to Big Spring Ck.	Jan 1 - Dec 31	4.5	3,258	3,258

Hwy - Highway NF - North Fork SF - South Fork

Table 12 (continued)

28

Judith River Drainage (continued)

East Fork Big Spring Ck.	Headwaters to Big Spring Creek	Jan 1 - Dec 31	7.5	5,430	5,430
Judith River #1	SF and MF to Big Spring Creek	Jan 1 - Dec 31	25	18,099	18,099
Judith River #2	Big Spring Creek to Missouri River	Jan 1 - Dec 31	160	115,835	115,835
Lost Fork Judith River	SF and WF to MF Judith River	Jan 1 - Dec 31	14	10,136	10,136
Middle Fork Judith River	Headwaters to South Fork	Jan 1 - Dec 31	22	15,928	15,928
South Fork Judith River	Headwaters to Middle Fork	Jan 1 - Dec 31	3.5	2,534	2,534
Warm Spring Creek	Springs to Judith River	Jan 1 - Dec 31	110	79,636	79,636
Yogo Creek	Headwaters to MF Judith River	Jan 1 - Dec 31	3	2,172	2,172

MUSSELSHELL RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(al)	(al/yr)
Alabaugh Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
American Fork Creek	South Fork to mouth	Jan 1 - Dec 31	5.5	3,982	3,982
Big Elk Creek	at Origin of Labo Fork to mouth	Jan 1 - Dec 31	9.5	6,878	6,878
Careless Creek	Headwaters to Roberts Creek	Jan 1 - Dec 31	2	1,448	1,448
Checkerboard Creek	East and West Forks to mouth	Jan 1 - Dec 31	6	4,344	4,344
Collar Gulch Creek	Headwaters to mouth	Jan 1 - Dec 31	0.6	434	434
Cottonwood Creek	WF, MF, and Loco Creek to mouth	Jan 1 - Dec 31	16	11,583	11,583
Flatwillow Creek	NF and SF to Petrolia Reservoir	Jan 1 - Dec 31	18	13,031	13,031
Musselshell River #1	NF and SF to Deadmans Basin Div	Jan 1 - Dec 31	80	57,917	57,917
Musselshell River #2	Deadmans Basin Div to Musselshell Div	Jan 1 - Dec 31	80	57,917	57,917
Musselshell River #3	Musselshell Diversion Dam at town of Musselshell to mouth	Jan 1 - Dec 31	70	50,678	50,678
NF Musselshell #1	Headwaters to Bair Reservoir	Jan 1 - Dec 31	3	2,172	2,172
NF Musselshell #2	Bair Reservoir to SF Musselshell R.	Jan 1 - Dec 31	16	11,583	11,583
SF Musselshell	Headwaters to North Fork	Jan 1 - Dec 31	30	21,719	21,719
Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	8	5,792	5,792
Swimming Woman Ck.	Headwaters to Cty road crossing 8 linear miles upstream from mouth	Jan 1 - Dec 31	2.5	1,810	1,810

MARIAS/TETON SUBBASIN

MARIAS RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(al)	(al/yr)
Badger Creek	N and S Badger creeks to Forest/Blackfeet Reservation Boundary	Jan 1 - Dec 31	60	43,438	43,438
Birch Creek	Swift Reservoir to Hwy 358	Jan 1 - Dec 31	64	46,334	46,334
Cut Bank Creek	Blackfeet Reservation boundary to mouth	Jan 1 - Dec 31	75	54,297	54,297
Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
Marias River #1	Two Medicine River and Cut Bank Creek to head of Tiber Reservoir	Jan 1 - Dec 31	200	144,793	144,793
Marias River #2	Tiber Dam to Circle Bridge (Hwy 223)	Jan 1 - Dec 31	500	361,983	361,983
Marias River #3	Circle Bridge (Hwy 223) to mouth	Jan 1 - Dec 31	560	405,421	405,421
North Badger Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136	10,136
NF Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
South Badger Creek	Headwaters to mouth	Jan 1 - Dec 31	40	28,959	28,959
SF Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344	4,344
SF Two Medicine River	Headwaters to Forest/Blackfeet Reservation Boundary	Jan 1 - Dec 31	16	11,583	11,583

TETON RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED		
			(cfs)	(al)	(al/yr)
Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	18	13,031	13,031
McDonald Creek	Headwaters to mouth	Jan 1 - Dec 31	10	7,240	7,240
NF Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	7.2	5,212	5,212
SF Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	6.9	4,995	4,995
Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	4.5	3,258	3,258
Teton River	Headwaters to discharge from Priest Butte Lake	Jan 1 - Dec 31	35	25,339	25,339

LAKES AND SWAMPS

Bean Lake	Sec. 18C and 19B, T18N, R6W, Sec. 13D and 24A, T18N, R7W	Jan 1 - Dec 31	—	2648.6 2,849	2648.6 2,849
Antelope Butte Swamp	North 1/2 Sec. 28, T26N, R8W	Jan 1 - Dec 31	—	460	460

Ck - Creek Cty - County Div - Diversion Hwy - Highway MF - Middle Fork NF - North Fork R - River SF - South Fork WF - West Fork

1 shall have priority over any other reservations granted by the
2 Board in this Order.

3 7. For those streams where the instream flow reservations of
4 DFWP overlap with reservations for DHES and BLM; the reservants
5 shall jointly hold such reservations.

6 8. The reservations for DFWP granted in this Order shall be
7 concurrent with, rather than cumulative to, any other instream
8 water rights DFWP held prior to July 1, 1985.

9
10 DHES Reservation

11 9. The Applicant, Montana Department of Health and
12 Environmental Sciences, is granted an instream flow reservation
13 throughout the year as follows:

	<u>Amount</u>	
	<u>cfs</u>	<u>acre-feet/year</u>
Missouri River at Toston	2596	1,879,504
Missouri River at Ulm	3204	2,319,696
Missouri River at Virgelle	4390	3,178,360
Missouri River at Landusky	4815	3,486,060

18 10. The reservation for MDHES shall be second in priority to
19 the municipal reservations granted in the Order, shall be equal in
20 priority to the instream flow reservations granted to the MDFWP and
21 BLM and shall have priority over any other reservations granted by
22 the Board in this Order.

23 11. For those streams where the instream flow reservations of
24 DHES overlap with reservations for DFWP and BLM, the reservants
25 shall jointly hold such reservations.
26

1 BLM Reservations

2 12. The Applicant, United States Department of Interior,
3 Bureau of Land Management (BLM), is granted instream flow
4 reservations in streams in the amounts and for the time periods set
5 forth in Table 13 attached hereto and incorporated herein by this
6 reference.

7 13. The reservations for BLM shall be second in priority to
8 the municipal reservations granted in the Order, shall be equal in
9 priority to the instream flow reservations granted to the MDHES and
10 DFWP and shall have priority over any other reservations granted by
11 the Board in this Order.

12 14. For those certain streams where the instream flow
13 reservations of BLM overlap with reservations for DHES and DFWP,
14 the reservants shall jointly hold such reservations.

15
16 Conservation District Reservations

17 15. Applicant Broadwater County Conservation District,
18 pursuant to its application, is granted a reservation of water to
19 be used in irrigation for the following projects, as described in
20 the application:

21
22

<u>Project No.</u>	<u>Peak Flows (cfs)</u>	<u>Annual Diversion (af)</u>	<u>Water Source</u>
BR-5	2.98	362	Canyon Ferry Lake
BR-11	0.98	119	Canyon Ferry Lake
BR-12	1.31	159	Canyon Ferry Lake
BR-14	5.64	746	Canyon Ferry Lake
BR-106	5.58	676	Canyon Ferry Lake
BR-107	2.30	278	Canyon Ferry Lake
BR-108	1.89	229	Canyon Ferry Lake
BR-109	2.13	258	Canyon Ferry Lake
BR-110	3.85	467	Canyon Ferry Lake

27
28

Table 13

Table 1-5. Reservations requested by BLM for maintenance of aquatic habitat and stream channels

Stream	Amount		Peak discharge every other year for channel maintenance cfs
	Year-round for aquatic habitat maintenance cfs	acre feet/year	
Bear Creek near Grant	6	4,344	50
Bear Creek near Wise River	2.5	1,810	50
Big Sheep Creek near Dell	40	28,960	300
Black Canyon Creek near Grant	2.5	1,810	35
Bloody Dick Creek near Grant	20	14,500	270
Cabin Creek near Dell	1	724	4
Canyon Creek near Divide	5	3,620	110
Camp Creek near Melrose	5	3,600	50
Corral Creek near Lakeview	2.5	1,810	20
Deadman Creek near Dell	4.5	3,258	50
Deep Creek near Wise River	30	21,720	500
East Fork Blacktail Deer Creek near Dillon	18	13,032	215
East Fork Dyce Creek near Dillon	1.5	1,086	9
Frying Pan Creek near Grant	1.5	1,086	35
Hell Roaring Creek	15	10,860	250
Indian Creek near Dell	1	724	5
Jones Creek near Lakeview	2	1,428	20
Long Creek near Lakeview	5	3,620	110
Medicine Lodge Creek near Grant	9	6,516	50
Moose Creek near Divide	8	5,800	70
North Fork Greenhorn Creek near Alder	3.5	2,534	35
Odell Creek near Lakeview	11	7,964	225
Peet Creek near Lakeview	1.5	1,090	30
Rape Creek near Grant	1	724	5
Shenon Creek near Grant	1	724	13
Simpson Creek near Dell	1	724	5
Tom Creek near Lakeview	2	1,448	25
Trapper Creek near Grant	1	724	10
West Fork Blacktail Deer Creek near Dillon	3	2,172	25
West Fork Dyce Creek near Dillon	1	724	5
Willow Creek near Glen	12	8,900	130

Table 1. Estimated population of the ...

Year	Population
1950	100
1955	110
1960	120
1965	130
1970	140
1975	150
1980	160
1985	170
1990	180
1995	190
2000	200
2005	210
2010	220
2015	230
2020	240
2025	250
2030	260
2035	270
2040	280
2045	290
2050	300
2055	310
2060	320
2065	330
2070	340
2075	350
2080	360
2085	370
2090	380
2095	390
2100	400

1 16. Applicant Cascade County Conservation District, pursuant
2 to its application, is granted a reservation of water to be used in
3 irrigation for the following projects, as described in the
4 application:

<u>Project No.</u>	<u>Peak Flows (cfs)</u>	<u>Annual Diversion (af)</u>	<u>Water Source</u>
CS-43	3.98	599	Belt Creek
CS-61	1.15	163	Smith River
CS-101	2.15	304	Missouri River
CS-102	1.39	186	Missouri River
CS-111	6.58	799	Missouri River
CS-351	2.73	369	Missouri River
CS-541	.54	69	Missouri River
CS-251	1.65	245	Smith River
CS-271	.93	134	Smith River
CS-331	.41	57	Smith River
CS-241	1.48	190	Sun River
CSI-11	2.23	287	Missouri River
CSI-12	.90	110	Missouri River
CSI-21	1.50	157	Missouri River
CSI-22	1.19	163	Missouri River
CSI-41	1.44	180	Missouri River
CSI-51	1.78	250	Missouri River
CSI-52	4.65	700	Missouri River
CSI-82	1.03	137	Sun River
CSI-83	.49	99	Sun River
CSI-92	.50	72	Sun River
CSI-101	1.57	223	Missouri River
CSI-103	3.71	557	Missouri River
CSI-102	1.28	171	Smith River

17. Applicant Choteau County Conservation District, pursuant
to Application No. 72307-41QJ, is granted a reservation of water to
be used in irrigation for the following projects, as described in
the application:

<u>Project No.</u>	<u>Peak Flows (cfs)</u>	<u>Annual Diversion (af)</u>	<u>Water Source</u>
CH-21	2.64	406	Missouri River
CH-201	.54	77	Shonkin Creek
CHI-10	2.36	314	Missouri River
CHI-21	5.29	752	Missouri River
CHI-22	3.06	389	Missouri River
CHI-30	4.19	643	Missouri River
CHI-40	1.89	290	Missouri River
CHI-51	1.63	244	Marias River
CHI-53	1.88	289	Marias River

18. Applicant Fergus County Conservation District, pursuant to it application, is granted a reservation of water to be used in irrigation for the following projects, as described in the application:

<u>Project No.</u>	<u>Peak Flows (cfs)</u>	<u>Annual Diversion (af)</u>	<u>Water Source</u>
FE-141	3.23	375	Wolverine Creek
FE-431	1.06	107	Little Casino Cr.
FE-671	6.43	748	Olsen Creek
FE-672	3.82	444	UT Olsen Creek
FE-673	1.13	131	UT Ross Fork Creek
FEI-10	1.59	192	Missouri River

19. Applicant Judith Basin County Conservation District, pursuant to it application, is granted a reservation of water to be used in irrigation for the following projects, as described in the application:

<u>Project No.</u>	<u>Peak Flows (cfs)</u>	<u>Annual Diversion (af)</u>	<u>Water Source</u>
JB-231	.75	92	Well
JB-232	.75	92	Well
JB-281	3.26	401	Wolf Creek
JBS-3	.44	28	Otter Creek

20. Applicant Lewis and Clark County Conservation District, pursuant to its application, is granted a reservation of water to be used in irrigation for the following projects, as described in the application:

<u>Project No.</u>	<u>Peak Flows (cfs)</u>	<u>Annual Diversion (af)</u>	<u>Water Source</u>
LC-11	.60	80	UT Tenmile Cr.
LC-210	1.25	148	Missouri River
LCI-10	1,22	185	Upper Holter Lake

21. Applicant Glacier County Conservation District, pursuant to its application, is granted a reservation of water to be used in irrigation for the following projects, as described in the application:

<u>Project No.</u>	<u>Peak Flows (cfs)</u>	<u>Annual Diversion (af)</u>	<u>Water Source</u>
GL-11	3.72	472	Cut Bank Creek
GL-221	4.37	579	Cut Bank Creek

22. Applicant Liberty County Conservation District, pursuant to its application, is granted a reservation of water to be used in irrigation for the following projects, as described in the application:

<u>Project No.</u>	<u>Peak Flows (cfs)</u>	<u>Annual Diversion (af)</u>	<u>Water Source</u>
LI-161	6.77	1043	Marias River
LI-162	4.65	690	Marias River

23. Applicant Teton County Conservation District, pursuant to its application, is granted a reservation of water to be used in irrigation for the following projects, as described in the application:

<u>Project No.</u>	<u>Peak Flows (cfs)</u>	<u>Annual Diversion (af)</u>	<u>Water Source</u>
TE-571	10.52	1593	Muddy Cr. (Sun R.)

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50 Applicant hereby certifies that the information furnished in this application is true and correct to the best of his knowledge and belief and that he is not aware of any facts which would render the same false or misleading.

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1 24. Applicant Valley County Conservation District, pursuant
2 to its application, is granted a reservation of water to be used in
3 irrigation for the following projects, as described in the
4 application:

5	<u>Project No.</u>	<u>Peak Flows (cfs)</u>	<u>Annual Diversion (af)</u>	<u>Water Source</u>
6	VAS-1	499.11	92,000	Fort Peck Reservoir

7 25. The reservations for the foregoing conservation districts
8 shall be third in priority to the municipalities and instream flow
9 reservants granted reservations in this Order, and shall have equal
10 priority among themselves.

11 26. All other reservation requests by conservation districts
12 are denied.

13 BUREC Reservation

14 27. The applicant, United States Department of Interior,
15 Bureau of Reclamation (BUREC), pursuant to its application, is
16 granted a reservation of water in the amount of 280 cfs from April
17 1 to October 30 for a total volume of 89,000 acre-feet a year.

18 28. The reservation for the BUREC shall be third in priority
19 to the municipalities and instream flow reservants granted
20 reservations in this Order, and shall have equal priority with the
21 conservation district reservations granted above.

22
23 General Conditions

24 29. All reservations granted in this Order shall have a
25 priority date and time of July 1, 1985, at 12:01 a.m., with the
26 relative priorities among them as set forth in this Order.

1 30. All consumptive use reservants shall comply with all
2 applicable federal, state and local laws, rules and regulations
3 prior to putting reserved water to use. These include, but are not
4 limited to, the applicable provisions of Title 85, MCA, and federal
5 and state water quality requirements.

6 31. All reservations for instream flows granted in this Order
7 shall be subject to existing water rights.

8 32. All reservations for irrigation projects granted in this
9 Order shall be subject to existing water rights and may not be
10 developed until a determination of water availability is made
11 through the statewide adjudication process.

12 Done and dated this ____ day of _____, 1992.

13 Board of Natural Resources and Conservation

14
15 _____
16 Chairman

17 *****

18 DATED: April 8, 1992.

19 Department of Fish, Wildlife and Parks

20
21 By Curtis E. Larsen

22 Curtis E. Larsen
23 Agency Legal Counsel
24 Robert N. Lane
25 Chief Legal Counsel

26 CERTIFICATE OF SERVICE

27 I hereby certify that on the 8th day of April, 1992, the
28 Montana Department of Fish, Wildlife and Parks' (Department) filed
the attached DEPARTMENT OF FISH, WILDLIFE AND PARKS' FINDINGS OF
FACTS, CONCLUSIONS OF LAW AND ORDER. A copy was served by hand-
delivering the original and two (2) true and accurate copies to:

1 Peter T. Stanley
2 % Department of Natural Resources and Conservation
3 1520 East Sixth
4 Helena, MT 59620

5 and by depositing true and accurate copies, postage prepaid, in the
6 United States Post Office at Helena, Montana, to the following
7 locations:

8 Loren Tucker
9 P.O. Box 36
10 Virginia City, MT 59755

Steve Brown
1313 11th Avenue
Helena, MT 59601

11 J. B. Anderson
12 112 S. Washington
13 Dillon, MT 59725

Paul B. Smith
P.O. Box 565
Boulder, MT 59632

14 Gary Spaeth
15 111 N. Broadway Ave.
16 Red Lodge, MT 59068

James Hubble
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Standford, MT 59479

17 Holly J. Franz
18 Gough, Shanahan, et. al.
19 P.O. Box 1715
20 Helen, MT 59624-1715

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Dale Schwanke
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Great Falls, MT 59403

24 Cindy Younkin
25 P.O. Box 1288
26 Bozeman, MT 59715

Keith Strong
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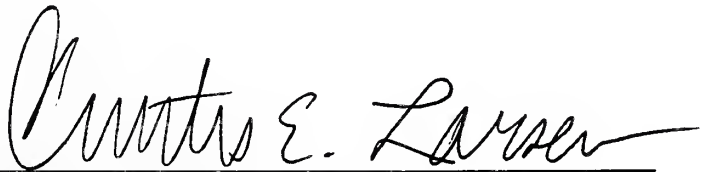
27 Ted J. Doney
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